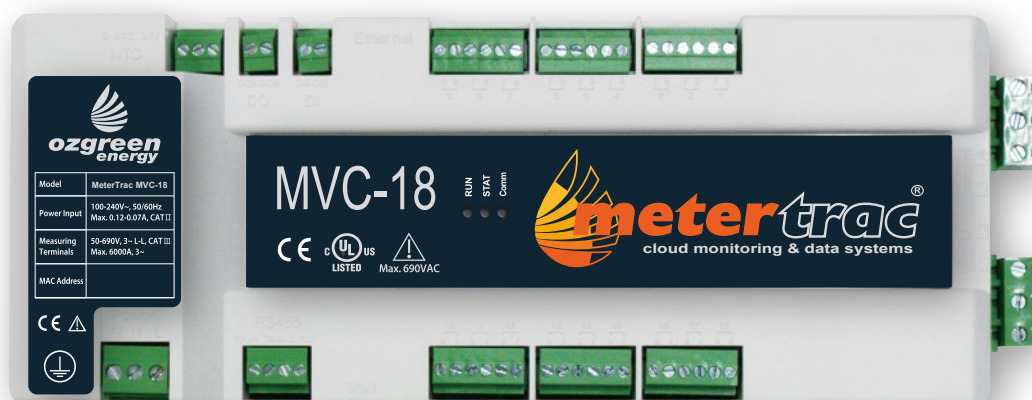




USER MANUAL



Explanation of



THIS SYMBOL ALERTS THAT IGNORING AN INSTRUCTION OR INCORRECT ACTION MAY CAUSE MINOR INJURY OR DAMAGE TO THE PRODUCT.



CAUTION, RISK OF ELECTRIC SHOCK.



PROTECTIVE CONDUCTOR TERMINAL.



ALTERNATING CURRENT.

Revision info.

Revision	Date	Description	Firmware version	Application version
VER 1.19	2014. 11. 03	manual	1.19	1.19

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Product

1. Introduction

MeterTrac MVC-18 installed in electric distribution and local panels enables facility managers to meter and monitor electric power of production line and facility equipment in detail and to analyse and diagnose the power consumption patterns. It allows engineers to improve facility processes and accomplish energy saving.

All electric power information is transmitted to the MeterTrac™ ActiveData system via Ethernet or serial communication. MeterTrac MVC-18 monitors up to 8 circuits for a 3 phase 3 wire circuit, 6 circuits for a 3 phase 4 wire circuit or 18 circuits of single phase or any combination of single and three phase circuits. Multiple numbers of MeterTrac meters can be connected together and remotely managed on the cloud.

This useful flexibility makes MeterTrac MVC-18 highly cost-effective for logging and monitoring system power in factories, IDCs (Internet Data Centers), office buildings, shopping malls, etc.

Real-time cloud MeterTrac™ analysis of power and control loads in different circuits and areas for illumination, HVAC, chillers, refrigeration systems, motors and plant and equipment allows engineers and managers to make actual energy savings, to improve predictive maintenance and to easily track operating costs.

MeterTrac Data Visualisations make it easy to see and understand actual electricity consumption for any time period. Users are able to find out which sub-systems are the worst performers and to take action. Users can also see when and where to optimise energy consumption when actual consumption exceeds target values.

2. Characteristics

- MeterTrac MVC-18 is able to measure and monitor multi electric power loads by one device.
- Max of 18 single phase or 8 3P3W or 6 3P4W feeder circuits for power monitoring
- Measurement: phase voltage, line voltage, line current, Frequency, Power Factor, Unbalance,
- Active/ Reactive/Apparent Power, Active/Reactive/Apparent Energy.
- 1.0/0.5 Class accuracy for power measurement conforming with IEC62053-21/IEC62053-22.
- Flexible application for single phase / 3 phase 4 wire / 3 phase 3 wire power circuits
- Cost saving for power monitoring integration.
- Sag/Swell detection.
- Harmonic reactive power (THD)
- 1 analog input terminal for a temperature measurement (NTC)
- Supports RS485 Serial (Modbus RTU) and Ethernet (Modbus TCP) Comms.

3. Specification

Model		MeterTrac MVC-18
Power system		1P2W, 3P3W (2CT), 3P4W (3 CT)
Inputs Rating	Voltage	50-690V, 3~ L-L, CAT III Max. 6000A, 3~
	Frequency	50 /60 Hz
	Current	100mA or 333mV (CT secondary side)
	Control power	100-240V~, 50/60Hz Max. 0.12-0.07A, CAT II
	Power Consumption	10W max
	Digital Input	1point, AC 220V external input power
	NTC	25 °C ,10k Ω , $(\beta(25/85)=3970^{\circ}\text{k})$
Output Contact		1-SPST, AC 250V 5A, DC 30V 5A
Communication		Modbus RS485 Modbus TCP
Usage		indoor use
altitude up to		2 000 m
Operating Temperature		- 10 °C to 55 °C"
Humidity		maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C
Over voltage category		II for AC Mains CAT III for Measurement Terminals
Pollution degree		2
Short-term temporary		overvoltage: 1440V for AC Mains
Long-term temporary		overvoltage: 490V for AC mains
Storage Temp.		-25• ~70•
Standards		IEC 62053-21/22

4. Measurement

Item	Display		Remark
	Unit	Digit	
Phase voltage	V	0.00 ~ 9,999,999.99	Max 400V for low voltage
Line voltage	V	0.00 ~ 9,999,999.99	Max 690V for low voltage
Line current	A	0.00 ~ 9,999,999.99	100mA or 333mV input, CT ratio
Active power	W	±0 ~ 999,999,999	
Reactive power	Var	±0 ~ 999,999,999	
Apparent power	VA	0 ~ 999,999,999	
Frequency	Hz	45.00 ~ 65.00	
Power Factor	%	± 100.00	
Temp. (NTC)	°C	-20.0 ~ 100.00	
Voltage unbalance	%	0.0 ~ 100.00	
Current unbalance	%	0.0 ~ 100.00	
Phase angle	°	0.0 ~ 360.00	Between voltage and current
THD	%	0.0 ~ 100.00	Harmonics reactive power
Active Energy	kWH	0.0 ~ 99,999,999.9	
Reactive Energy	kVarH	0.0 ~ 99,999,999.9	
Apparent Energy	kVAH	0.0 ~ 99,999,999.9	

■ Installation

1. Installation Conditions

Do not install where direct interference exists such as high temperature and strong electromagnetic fields. Please check the environment conditions around the proposed MeterTrac MV-18 installation site as below for correct operation.

Location	Indoor
Operation temp	-10 °C~ 55 °C [14°F ~ 131°F]
Storage temp	-25 °C~ 70 °C [-13°F ~ 158°F]
Operation humidity	Non condensation, 5% ~ 95%



WARNING

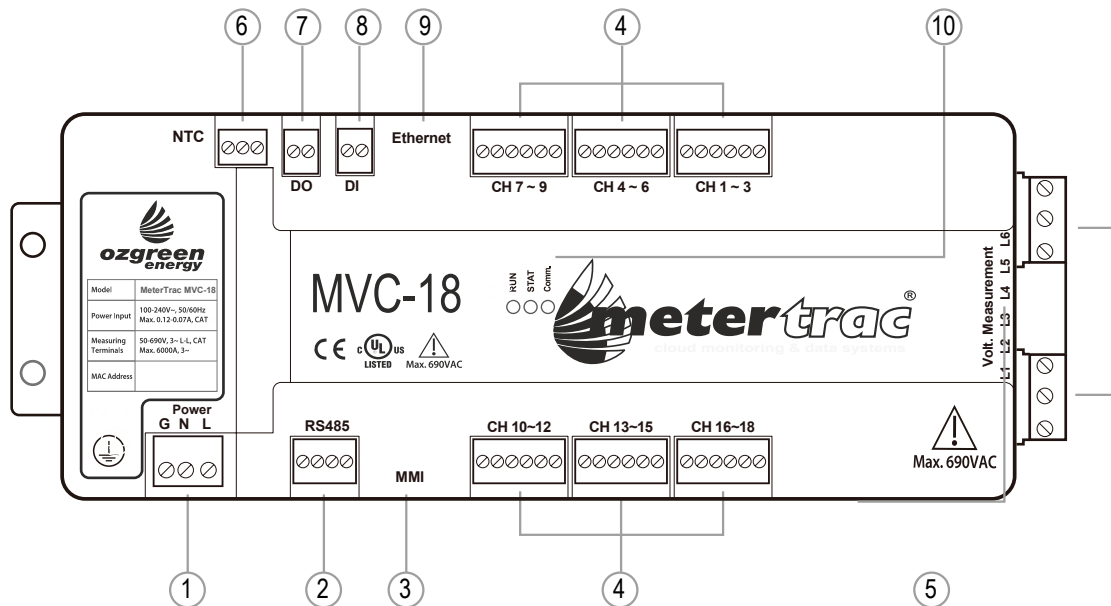
MeterTrac MV-18 should be installed inside an electric cabinet or panel to prevent access to the terminals of MeterTrac MV-18 meter by any persons after MeterTrac MV-18 is installed. MeterTrac MV-18 is a indoor product and must not be exposed directly to the external environment.



WARNING

To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

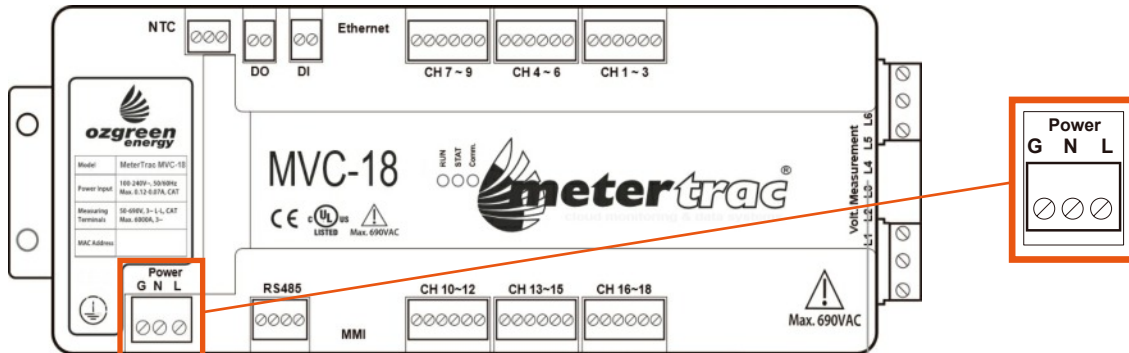
2. Terminals



No.	Name	Description
1	Control Power	Supplies control power to the Meter Trac MCV-18 (AC/DC 100~240V)
2	RS485	To connect to MeterTrac external IO module or to SCADA systems
3	MMI Port	RS232 Port to connect the MeterTrac configurator
4	1~18 CT	CT input terminal (rating is 100mA or 333mV max/secondary side of CT)
5	Voltage Input	Voltage input terminal for measurement
6	Temp.Terminal	NTC or 4~20mA input terminal
7	DO Terminal	Digital Output Terminal
8	DI Terminal	Digital Input Terminal (with 220VAC)
9	Ethernet Port	Communication with Master (Modbus Slave)
10	Status LED	RUN : Normal operation STAT : Normal metering Comm : normal communication (flickering LED is normal status)

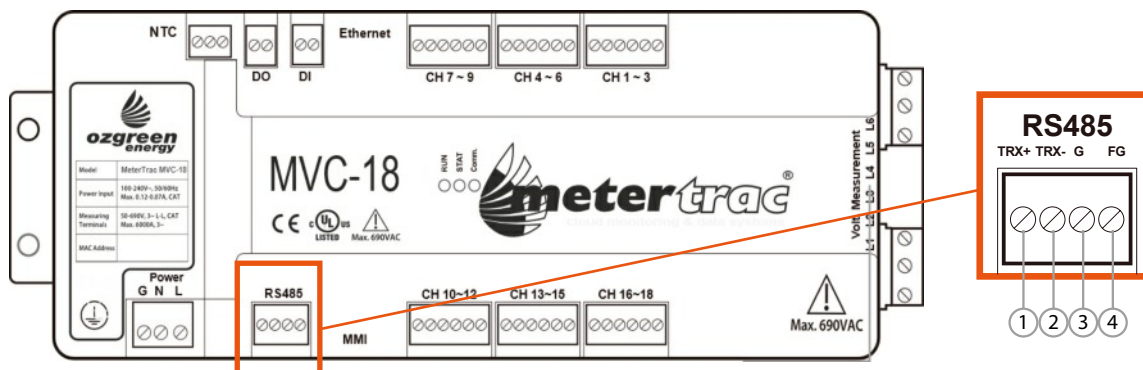
2.1 Control Power

Power supply port to operate MeterTrac MCV - 18. (AC/DC 100~240 V)



Pin Number	Description
L	Line(AC), +(DC) connection
N	Neutral(AC), -(DC) connection
G	Ground

2.2 RS485 Port

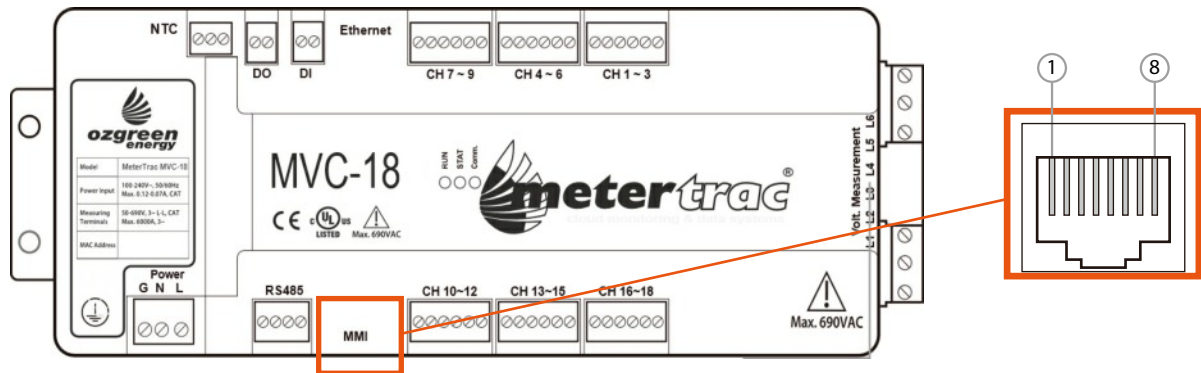


RS-485 Pin No.	Description
1	Transmit +
2	Transmit -
3	Ground
4	Frame Ground

- can be used for serial communication option with a host as a Modbus slave
- communication setting is done through the MeterTrac configurator.

2.3 (RS-232) Port

The MeterTrac Configurator communicates with the MeterTrac MCV-18 through this port. MeterTrac Configurator is used for setting up the meter and the metering data and setting values. It also gives write commands for configuration of Communication, PT ratio, Analog Input and register settings etc.

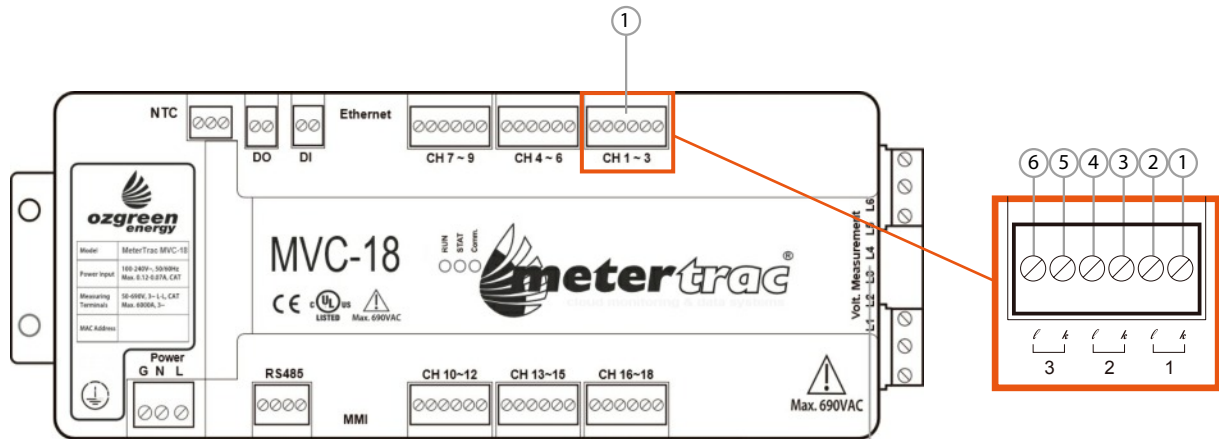


RJ-45 Pin No.	Description
3,6	Signal Ground
4	Transmit
5	Receive

Configuration	Description
Serial Comm. type	RS-232C
Start Bit	1 Bit
Stop Bit	1 Bit
Data Bit	8 Bit
Parity	none
Comm. Speed	115,200 bps
Modbus ID	1

2.4 CT Input Terminal

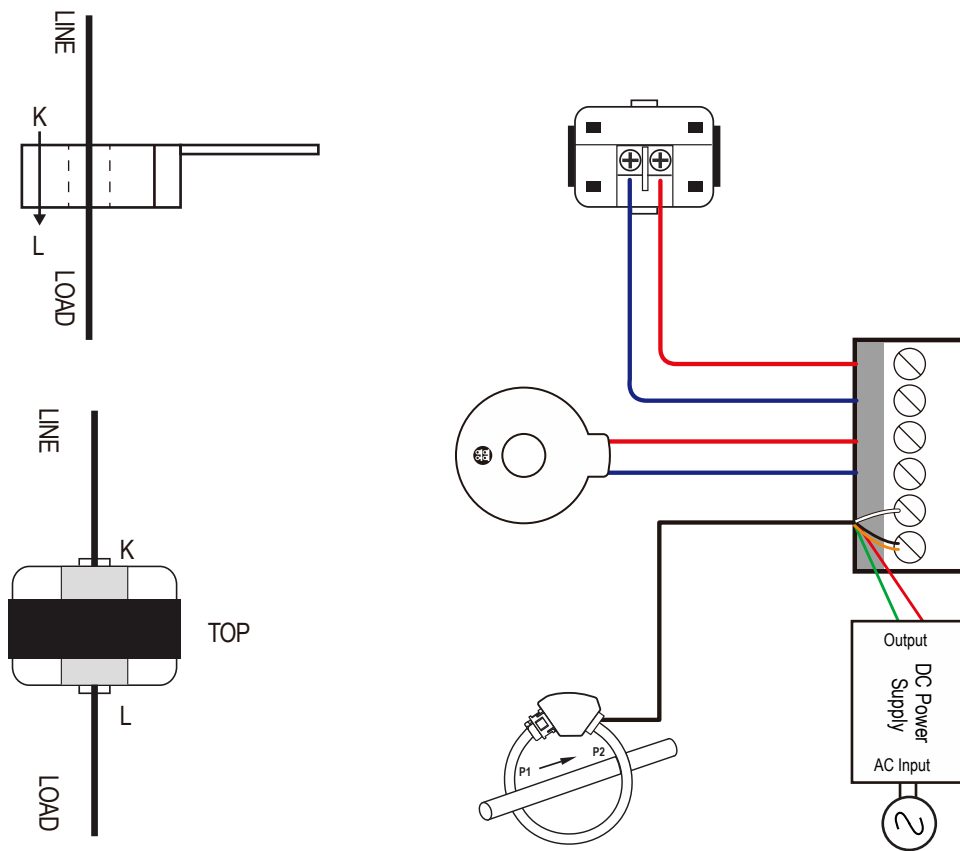
CTs are connected to this terminal. The secondary CT ratio is 100mA or 333mV for solid core CT or Split core CT's. The CT terminals must meet the correct side of CT to measure power correctly. All CT's are labelled with a red dot to indicate which side of the CT faces the load source. Separate instructions are included packaged with MeterTrac MCV-18 CT's. CT's



- CH 1~9 : No.1 from the right side.
- CH 10~18 : No. 10 from the left side.

Pin No.	Description
1,3,5	K side of CT
2,4,6	L side of CT

► CT direction with the power line direction

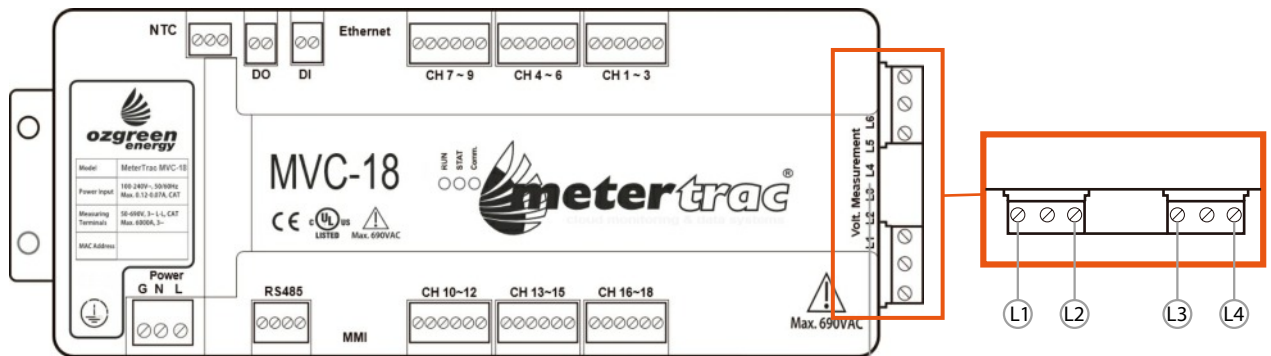


GUIDE

- Wiring with a CT should follow the direction of CT in that the power line side is at K of CT and Load side is at L of CT
- Connect the terminal K of CT to the CT input terminal K of MeterTRac MCV-18 and the terminal L of CT to the CT

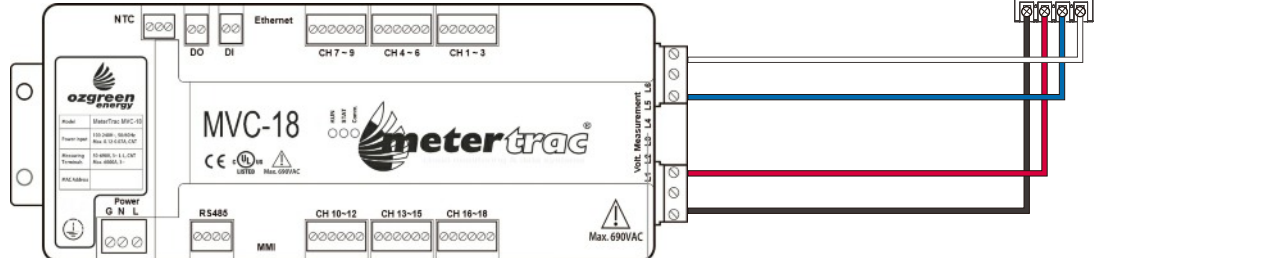
2.5 Voltage Input Terminal

This terminal is for the reference voltage measurement. It should follow the voltage phase order to measure power correctly. It can be verified in the Vector diagram of MeterTrac Configurator easily.



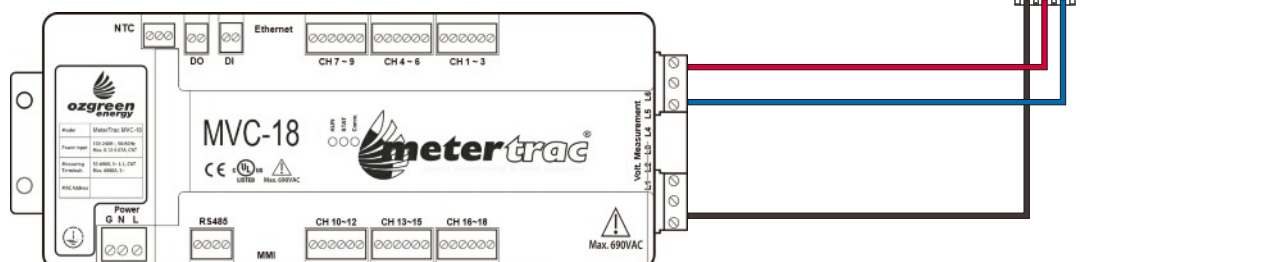
► Wiring of 3 Phase 4 Wire system

Pin No.	Power Line
L1	R
L2	S
L3	T
L4	N

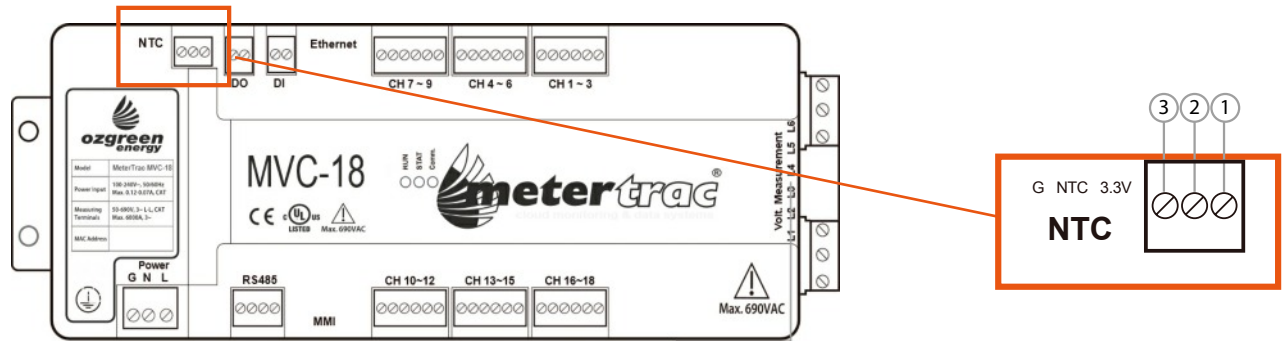


► Wiring of 3 Phase 3 Wire system

Pin No.	Power Line
L1	R
L2	-
L3	T
L4	S



2.6 Temperature Sensor Terminal



Measurement of temperature is by NTC or 4~20mA signal input at this port.
 *NOTE: The default input is NTC (4~20mA input is a special model build)

Sensor type	Pin
NTC	1, 2
4~20mA	2 : +
	3 : -

The temperature settings can be done in the MeterTrac Configurator.

Analog Input

AI Type

0:NTC

0:NTC

Min Temp

°C

Max Temp

°C

Alarm

45.0 °C

In case of NTC sensor use the settings in the table below.

Temperature	Resistance
0	32.65 kΩ
50	3.603 kΩ
100	0.68 kΩ

For 4~20mA input signal, the temperature setting is done by using a Min/Max temp setting.

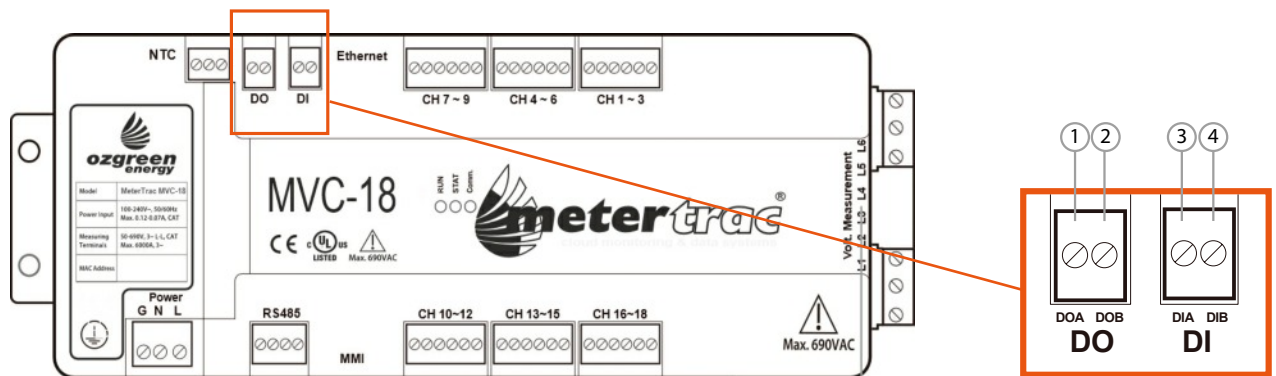
Item	Description
Min Temp.	input a Temp. value at 4mA
Max Temp.	input a Temp. value at 20mA

The DO of MeterTrac MVC-18 is operated by the temp Alarm setting.

- If the temp. value is higher than the Alarm setting, the DO switches to ON status.
- If the temp. value is lower than the Alarm setting, the DO switches to OFF status.

2.7 DI/DO (Digital Input/Digital Output) Port

- DO terminal can be used as below.
 - 1) Temperature Alarm
 - When the temperature exceeds the setting for more than 5 sec. it operates
 - 2) Event Alarm
 - It can also be configured to trigger by Sag, Swell, and OC events as well.
- DO reset is done by as below.
 - 1) Event status change.
 - 2) Reset by the DI inpt
 - 3) Reset by the communication (Address 10061)
- DI rating: AC220V latch voltage input is needed
- DO rating: Rating is 250VAC/5A, 30VDC/5A resistive

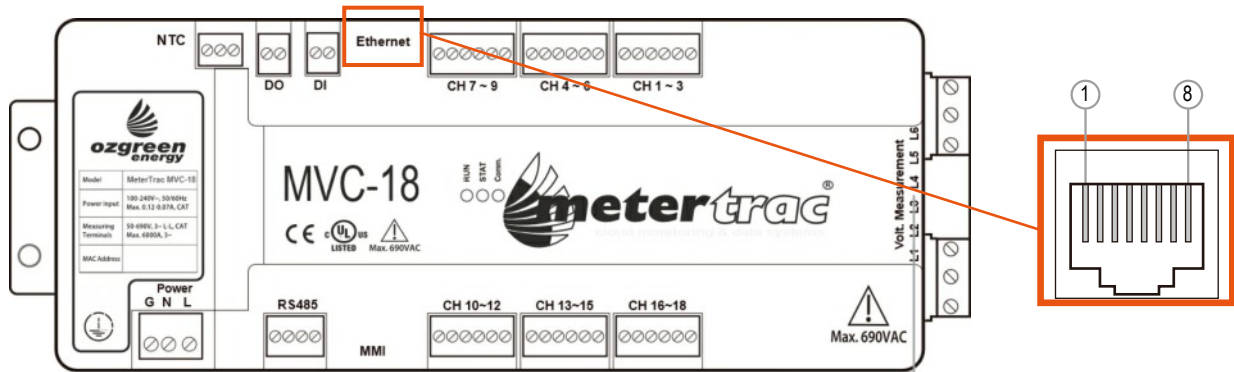


Pin No.	Description
1	DO+ terminal
2	DO- terminal
3	DI+ terminal
4	DI- terminal

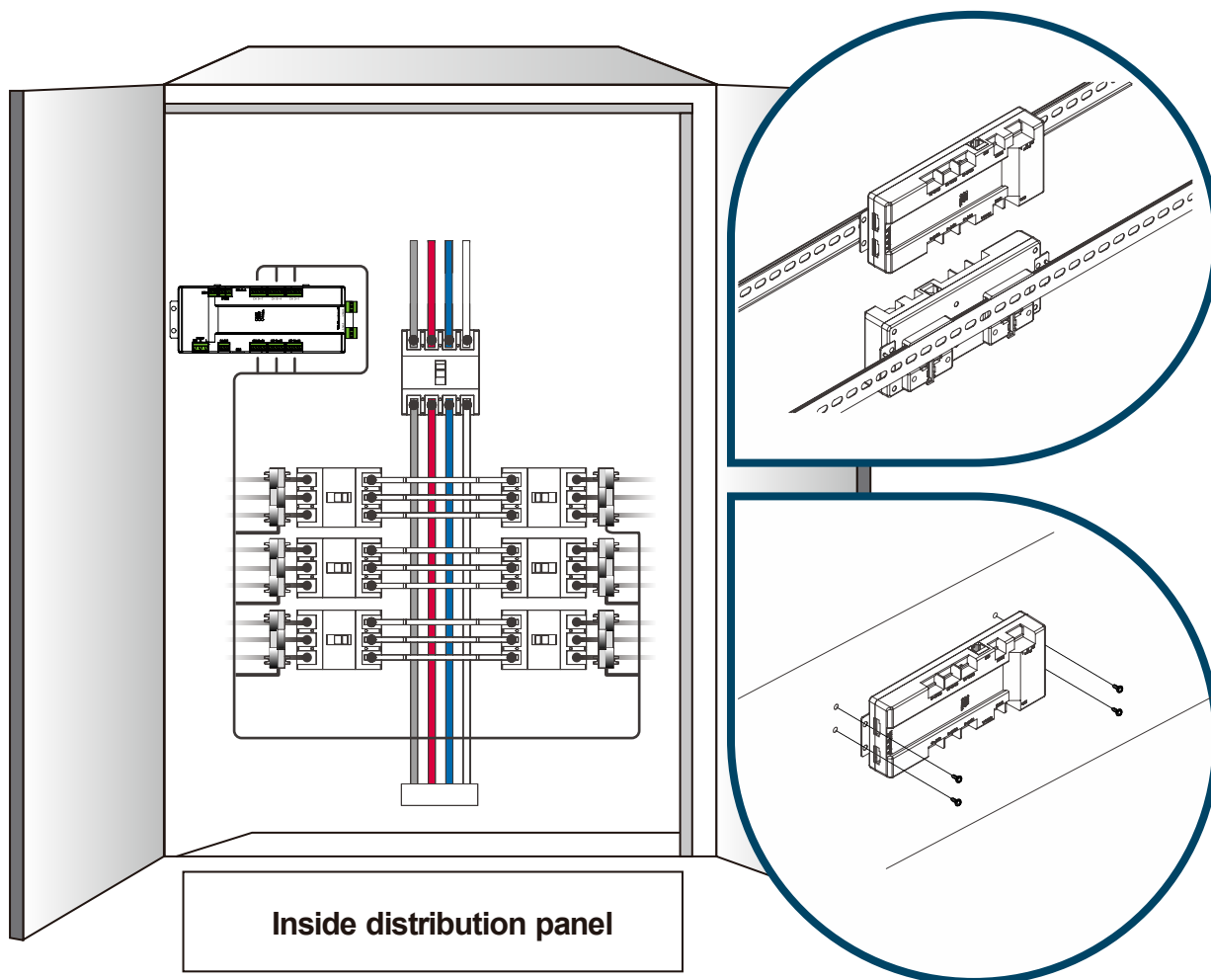
2.8 Ethernet Port

It communicates with a Host.

- Protocol : Modbus TCP/IP
- Speed : 10/100 Mbps Automatic selection

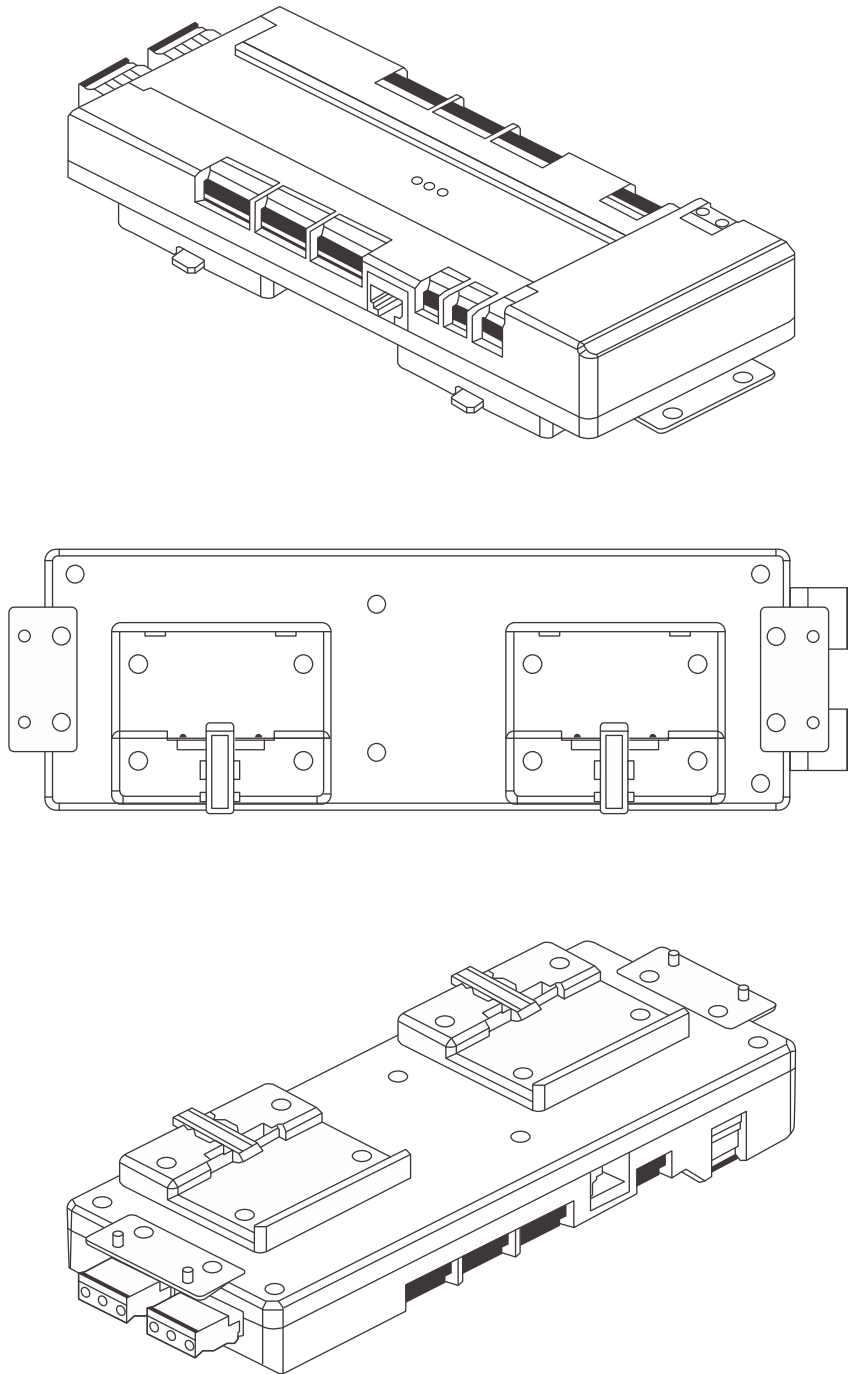


RJ-45 Pin No.	Description
1	Transmit +
2	Transmit -
3	Receive +
6	Receive

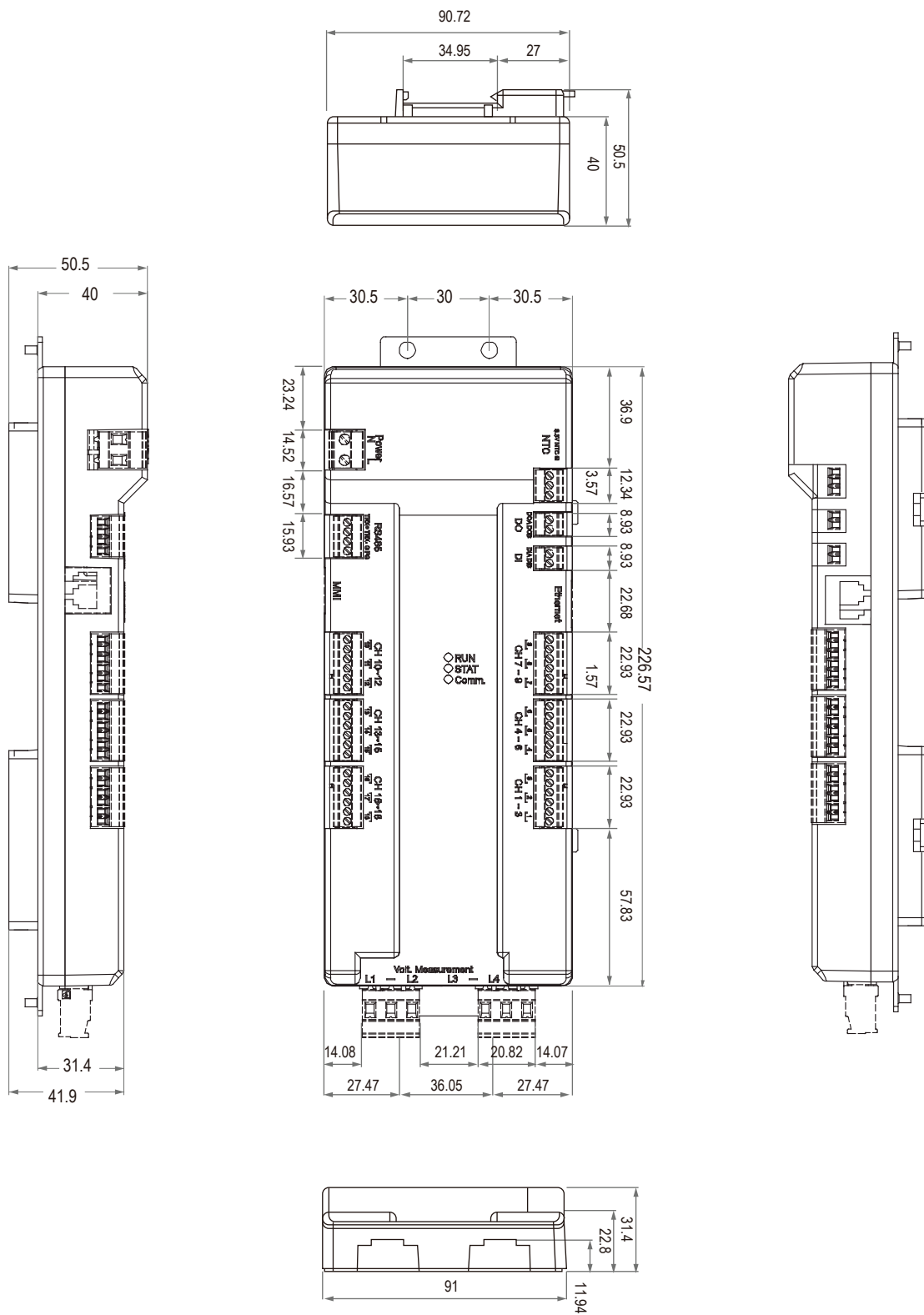


3. Appearance and dimensions

3.1 MeterTrac MVC-18 Appearance



3.2 MeterTrac MVC-18 dimensions



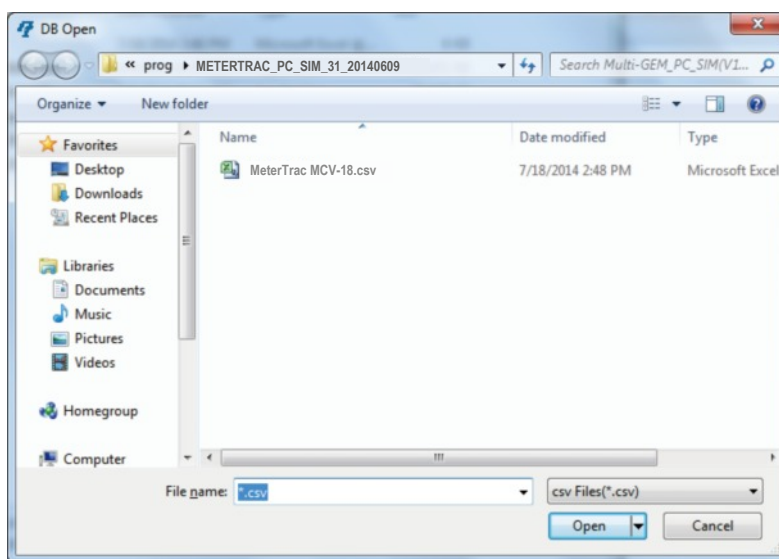
1. Introduction

The MeterTrac™ Configurator tool is used at time of meter installation to input meter settings and to check that each data stream of the load is operating. It is composed of three main screens, the Monitor, Configuration and Calibration. Five categories are available in the Monitor screen to see the values and basic settings when commissioning the MeterTrac MCV-19.

2. MeterTrac™ Configurator Start and Exit

2.1 Software Start

The MeterTrac™ Configurator has only one exe file which doesn't need a setup file. When you copy the MeterTrac™ Configurator exe file to a PC and click the file, it will open a file screen display like below.

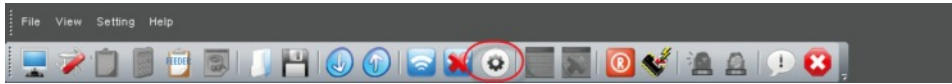


- If you have a existing MeterTrac MV-18 setup file saved, select the file and click the open button.
- If you want to make a new DB file, select the cancel button.

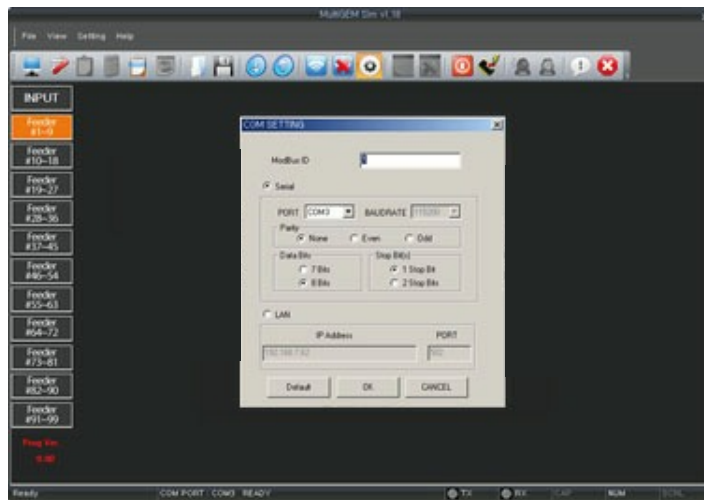
After this step the initial screen opens as below:



2.2 Comm.



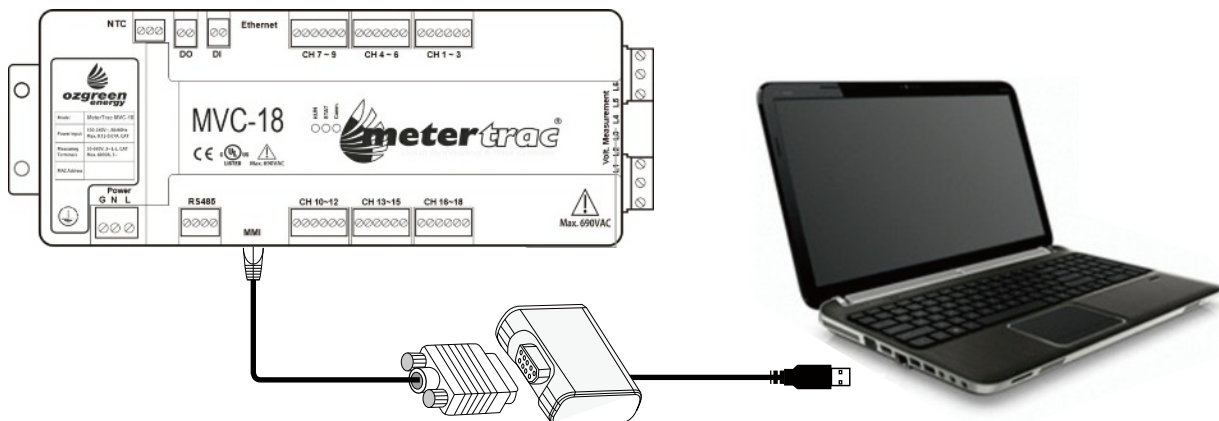
- When you click the Comm. setting menu in the Menu icon bar, the Comm. setting window pops up like below.



- For communication between the Simulator and the MeterTrac MCV-18, both Serial and LAN are available.

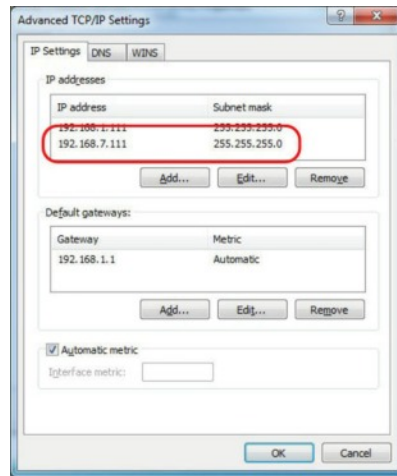
1) Serial Port

- Confirm the PC Port connected to the MeterTrac MCV-18 Comm, speed baudrate of 115,200 fixed values.
- After selecting the Serial, select Comm port of PC



2) LAN Port

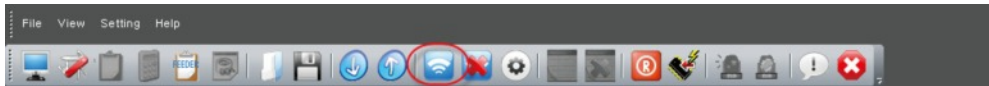
1. Connect the Ethernet Port to Hub or PC
(If there is no function of MDI/MDIX , use a cross cable)
2. For the initial setting of PC, set the PC with the IP band of MeterTrac MCV-18.



3. Input the IP and Port number of MeterTrac MCV-18 to be connected.
(Default IP : 192.168.7.64, Port no. 502)

2.3 Comm. Start

- Click the connect icon on the icon bar to start Comm.



2.4 Comm. End

- Click the disconnect icon on the icon bar to end Comm.



2.5 Software Exit

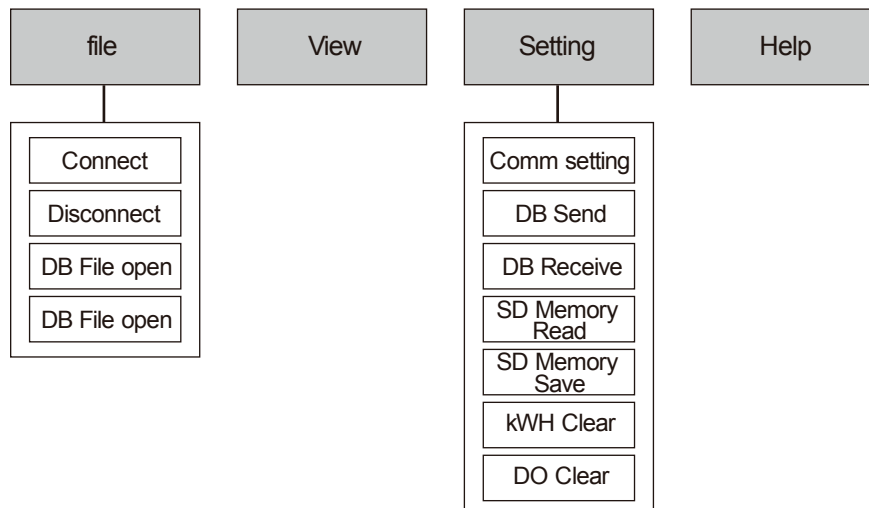
Click the Exit icon on the icon bar and software will close.



3. System Composition

3.1 1 Menu tree

- | | |
|--------------------|---|
| 1) Connect | PC connects the communication with MeterTrac MCV-18. |
| 2) Disconnect | PC disconnects the communication with MeterTrac MCV-18. |
| 3) DB File open | Opens the setting database file of feeder circuits stored in PC. |
| 4) DB File save | Stores the setting database file of feeder circuits modified in PC. |
| 5) Comm setting | Defines the communication configuration. |
| 6) DB Send | Sends a feeder circuit setting file to MeterTrac MCV-18. |
| 7) DB Receive | PC receives a feeder circuit setting file configured from MeterTrac MCV-18 |
| 8) SD Memory Read | MeterTrac MCV-18 reads and stores the setting values and energy data stored in SD memory of MeterTrac MCV-18. (This information is used only when MeterTrac MCV-18 is replaced) |
| 9) SD Memory Write | MeterTrac MCV-18 stores the setting values and Energy data in SD memory (It also stores and updates automatically every 1 hour) |



3.2 Icon items



1) Monitor

- Temperature
- Frequency
- 1st(Main) Feeder Data
- Voltage, Current
- Power (Active, Reactive, Apparent)
- Power Factor
- Current Unbalance
- Power THD
- Energy (Active/Reactive/Apparent, This month/Last month /Total)
- Voltage/ Current Vector diagram
- Feeder Setting(Type, CT Primary Ratio, Terminal connection number, Overcurrent Level)
- Demand (Feeder #1)

2) Setting

■ Config

- Model select
- Frequency
- Main wire system
- Feeder Count
- DO Alarm
- DO Reset

■ Communication

- Protocol
- IP
- Gateway
- Subnet Mask
- Manufacture ID
- TCP Port Number
- Device ID
- RS485 port usage
- RS485 baudrate

■ PT/CT Ratio

- 1st PT/CT ratio
- 2nd PT ratio

■ Analog Input

- Analog input type setting
- Min, Max temp. setting
- Alarm Trigger Level setting

■ Sag/Swell

- Level
- Period

■ Etc

- Deadband
- Current Threshold
- Overcurrent delay time

■ Demand

- Target kW Target kW
- Demand time setting
- Alarm Level

3) Feeder Power Circuit Setting

- Type
- CT Ratio
- Connect CH
- Starting Current
- Overcurrent Level
- Alarm Use
- LED X,Y

4) DB File Open

5) DB File Save

6) DB Send

7) DB Receive

8) Connect

9) Disconnect

10) Comm, Setting

11) Reset

4. Monitoring

4.1 Feeder Selection

Monitor the measured values of loads with MeterTrac MCV-18.

After Selecting a feeder group, select a feeder of the group for which to monitor values.

When a feeder, is selected the color of the item is changed into orange.

1) Feeder Group selection

This selects 9 feeder group units. When the group is selected, the color is changed into orange to show that it is activated.

2) It shows sum of current and active power of the feeder selected. In case of single phase, it shows one phase value connected.



4.2 Temperature and Frequency



- 1) Temp, : Displays the temperature value measured by NTC or 4~20mA.
- 2) Frequency : Displays frequency measured.

4.3 Feeder Data

- 1) Sum current /Total active Power of a feeder.
- Displays sum current and total active power of a feeder in the group.
- Example) Displays 6.5A/1230W for R : 2A/400W, S : 2.5A/430W, T :



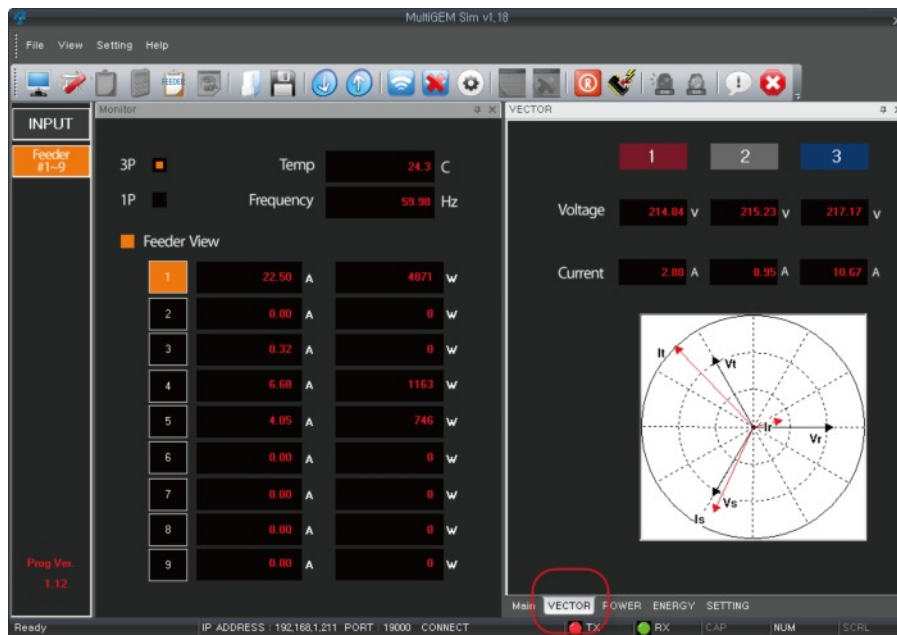
2) Feeder Main Data

- When setting up and commissioning the MeterTrac MVC-18 this is the main window to show voltage, current, power, PF, current unbalance, power THD, total Energy of a feeder and to check CT orientation and MeterTrac CT ratios.



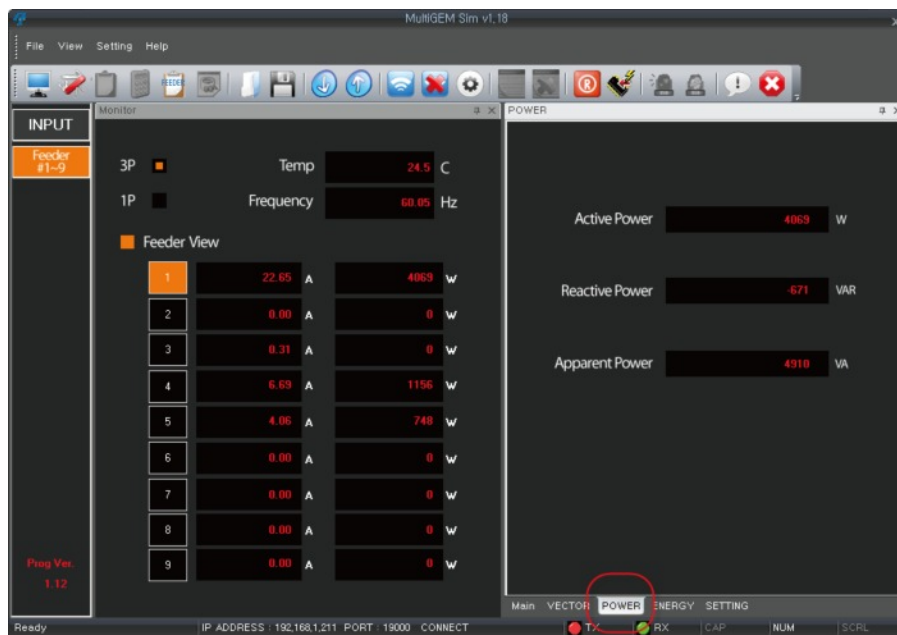
3) Feeder Vector Diagram

- This window displays the Vector diagram of voltage and current of a feeder. (Voltage angle is assumed as 120 degree balanced)



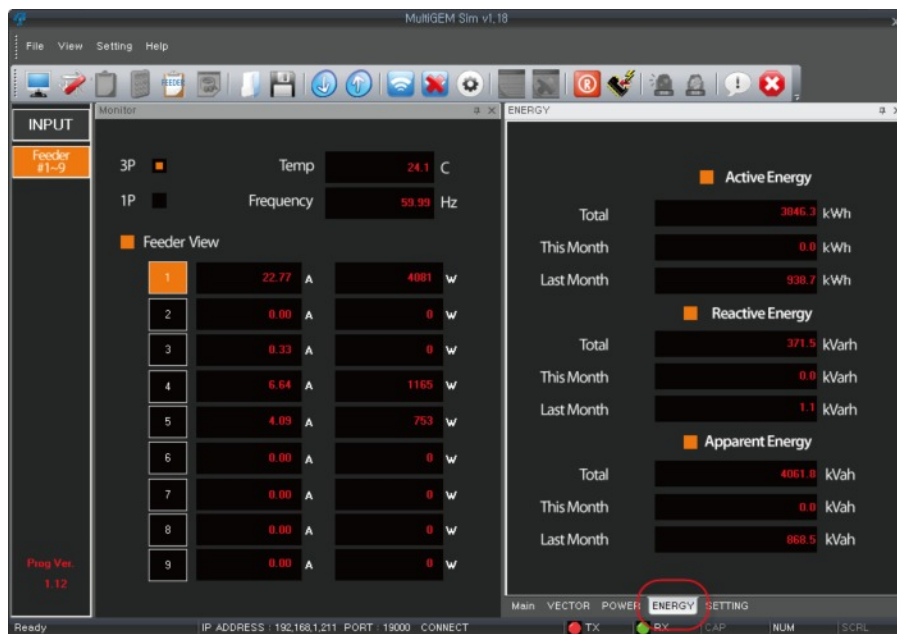
4) Feeder Power Data

- This window shows the total power data of a feeder.



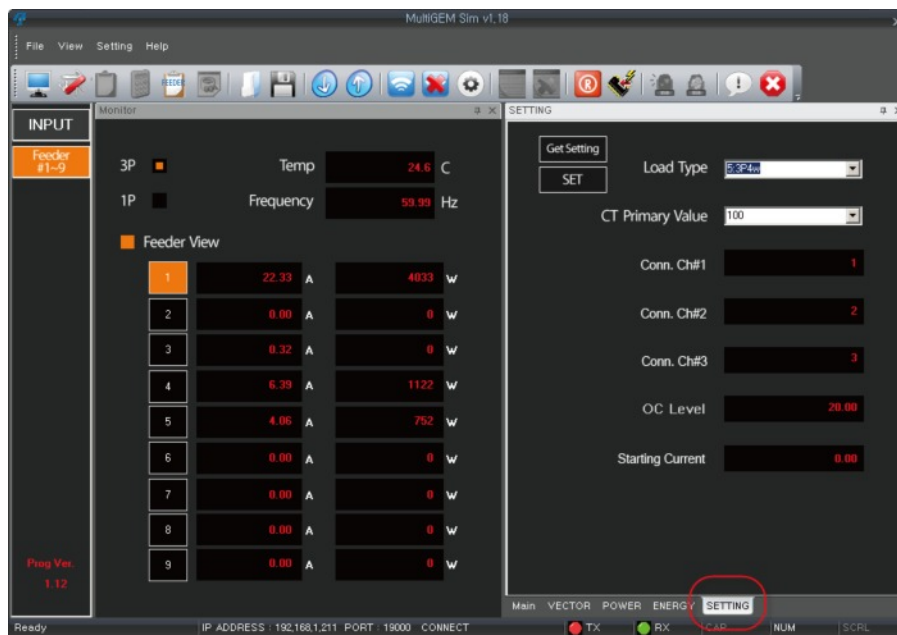
5) Feeder Energy Data

- This window displays Active/Reactive/Apparent Energy of Total/This month/Last month



6) Feeder Setting Data

- This window is used for feeder settings



- Get Setting : It brings up the setting data stored in MeterTrac MCV-18
- SET : Stores the changed data in MeterTrac MCV-18.
- TYPE : Sets the system phase and wire of a Feeder.
 - * 1P & R phase connection : 1P2W_R
 - * 1P & S phase connection : 1P2W_S
 - * 1P & T phase connection : 1P2W_T
 - * 3P3W 2CT : 3P3W
 - * 3P4W : 3P4W
 - * 3P3W(3CT) : 3P3W
- Connected CH# : Input the terminal number of the connected CT.
- OC Level : Set an overcurrent level.
- Starting Current : Set the starting current threshold of the feeders.
Displays '0' A for current lower than that.

In case of Feeder Setting,  icon helps with the detail setting.

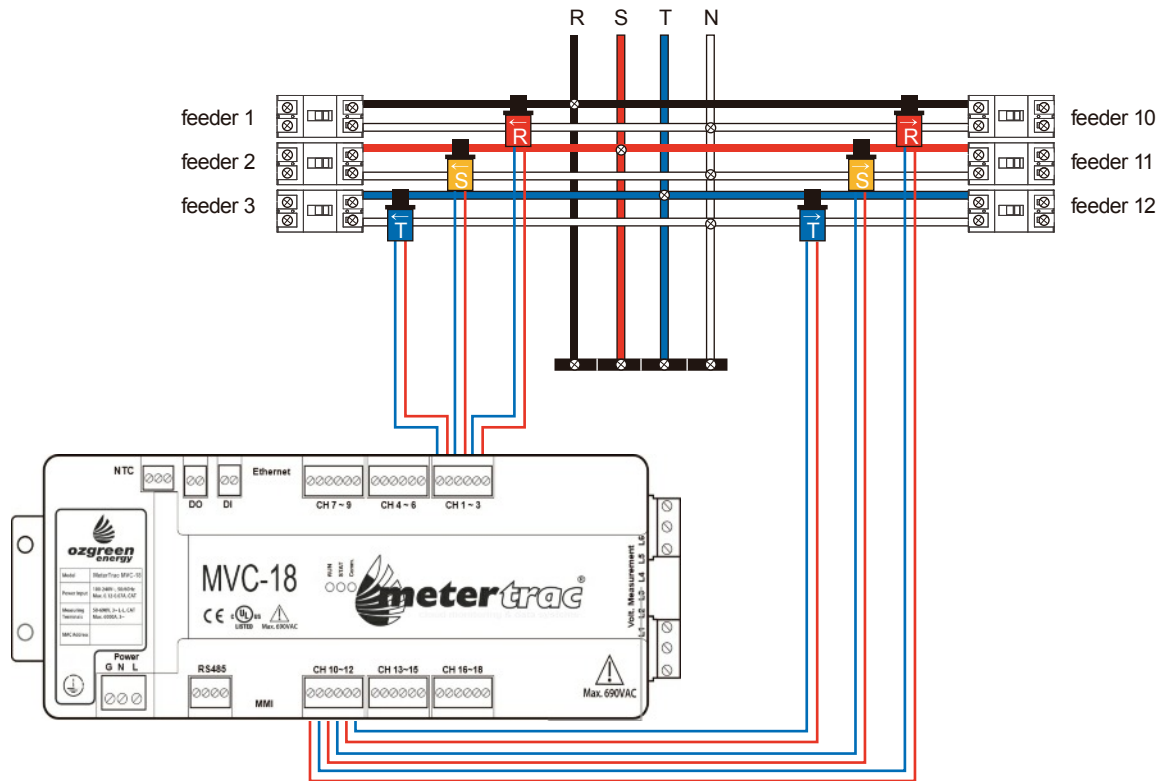


GUIDE

CH number 1~3 is fixed for use in determining Sag/Swell/Demand measurements with R,S,T phase of the first feeder.

CH 1 : R(RS), CH 2 : S(TR), CH 3 : T(TS)

7) Example 1 - single phase



- Setting up from the menu [Feeder Setting]

MultiGEM Sim v1.17

File View Setting Help

Ready COM PORT COM3 CONNECT TX RX CAP NUM SCRL

Number	TYPE	CT Ratio	CH #1	CH #2	CH #3	OC Level	Alarm Use	Ext. DO ID	Ext. Do Point	LED X	LED Y
Input						0,00	N	0	0	---	---
#01	1P2w R	50	1	2	3	10,00	N	1	4	---	---
#02	1P2w S	50	2	5	6	10,00	N	1	5	---	---
#03	1P2w T	50	3	8	9	10,00	N	1	6	---	---
#04	1P2w R	50	4	11	12	10,00	N	1	7	---	---
#05	1P2w S	50	5	14	15	10,00	N	1	8	---	---
#06	1P2w T	50	6	17	18	10,00	N	1	9	---	---
#07	1P2w R	50	7	0	0	0,00	N	0	0	---	---
#08	1P2w S	50	8	0	0	0,00	N	0	0	---	---
#09	1P2w T	50	9	0	0	0,00	N	0	0	---	---
#10	1P2w R	50	10	0	0	0,00	N	0	0	---	---
#11	1P2w S	50	11	0	0	0,00	N	0	0	---	---
#12	1P2w T	50	12	0	0	0,00	N	0	0	---	---
#13	1P2w R	50	13	0	0	0,00	N	0	0	---	---
#14	1P2w S	50	14	0	0	0,00	N	0	0	---	---
#15	1P2w T	50	15	0	0	0,00	N	0	0	---	---
#16	1P2w R	50	16	0	0	0,00	N	0	0	---	---
#17	1P2w S	50	17	0	0	0,00	N	0	0	---	---
#18	1P2w T	50	18	0	0	0,00	N	0	0	---	---
#19											

■ Setting up using the menu of [Monitor/Feeder Setting]

The following table summarizes the settings for feeders 1, 2, and 3 as shown in the screenshots:

Feeder	Load Type	CT Primary Value	Breaker Match #1	Breaker Match #2	Breaker Match #3	OC Level
Feeder 1	1:1P2wR	50	1			10.00
Feeder 2	2:1P2wS	50	2			10.00
Feeder 3	3:1P2wT	50	3			10.00

feeder 1 setting

feeder 2 setting

feeder 3 setting

The following table summarizes the settings for feeders 10, 11, and 12 as shown in the screenshots:

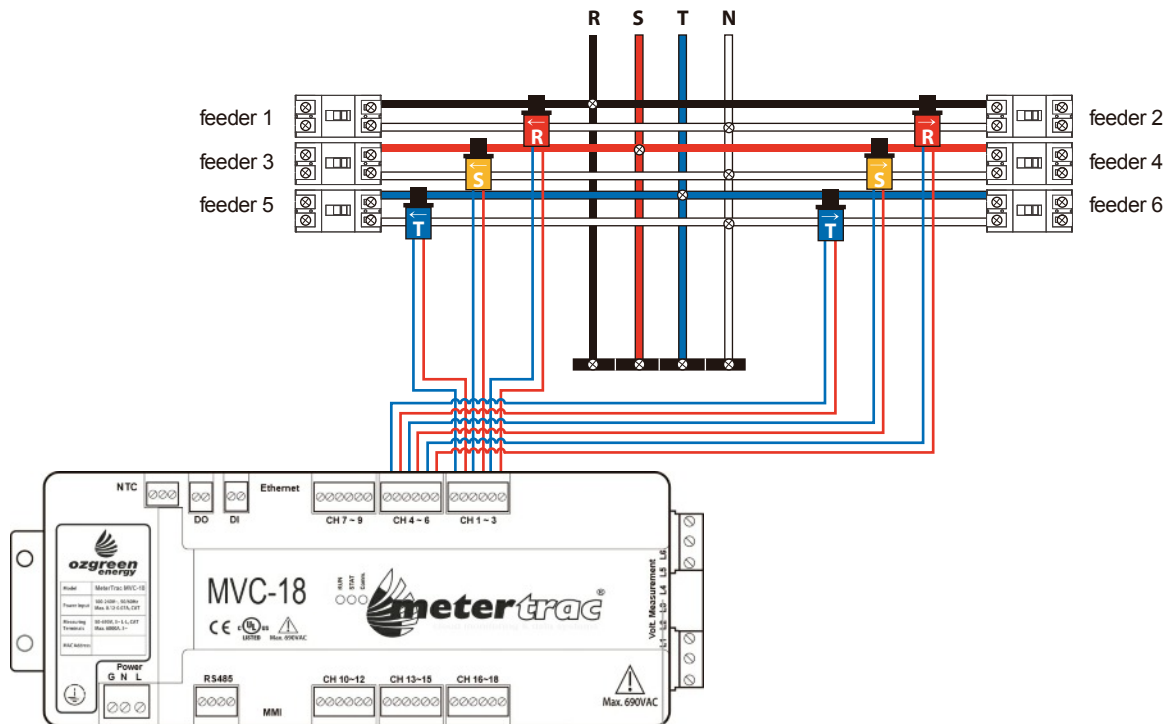
Feeder	Load Type	CT Primary Value	Breaker Match #1	Breaker Match #2	Breaker Match #3	OC Level
Feeder 10	1:1P2wR	50	10			10.00
Feeder 11	2:1P2wS	50	11			10.00
Feeder 12	3:1P2wT	50	12			10.00

feeder 10 setting

feeder 11 setting

feeder 12 setting

8) Example 2) - single phase connection



■ Setting using the menu [Feeder Setting]

MultiGEM Sim v1.17

Number	TYPE	CT Ratio	CH #1	CH #2	CH #3	OC Level	Alarm Use	Ext. DO ID	Ext. Do Point	LED X	LED Y
Input						0,00	N	0	0		
#01	1P2w R	50	1	2	3	10,00	N	1	4		
#02	1P2w R	50	4	5	6	10,00	N	1	5		
#03	1P2w S	50	2	8	9	10,00	N	1	6		
#04	1P2w S	50	5	11	12	10,00	N	1	7		
#05	1P2w T	50	3	14	15	10,00	N	1	8		
#06	1P2w T	50	6	17	18	10,00	N	1	9		
#07	1P2w R	50	7	0	0	10,00	N	0	0		
#08	1P2w R	50	10	0	0	10,00	N	0	0		
#09	1P2w S	50	8	0	0	10,00	N	0	0		
#10	1P2w S	50	11	0	0	10,00	N	0	0		
#11	1P2w T	50	9	0	0	10,00	N	0	0		
#12	1P2w T	50	12	0	0	10,00	N	0	0		
#13	1P2w R	50	13	0	0	10,00	N	0	0		
#14	1P2w R	50	16	0	0	10,00	N	0	0		
#15	1P2w S	50	14	0	0	10,00	N	0	0		
#16	1P2w S	50	17	0	0	10,00	N	0	0		
#17	1P2w T	50	15	0	0	10,00	N	0	0		
#18	1P2w T	50	18	0	0	10,00	N	0	0		
#19											

Ready COM PORT COM3 CONNECT TX RX CAP NUM SCPL

■ Setting by the menu of [Monitor/Feeder Setting]

The following table summarizes the settings for the three feeders shown in the top row of screenshots:

Feeder	Load Type	CT Primary Value	Breaker Match #1	Breaker Match #2	Breaker Match #3	OC Level
Feeder 1	1.1P2wR	50				10.00
Feeder 2	1.1P2wR	50				10.00
Feeder 3	2.1P2wS	50				10.00

feeder 1 setting

feeder 2 setting

feeder 3 setting

The following table summarizes the settings for the three feeders shown in the bottom row of screenshots:

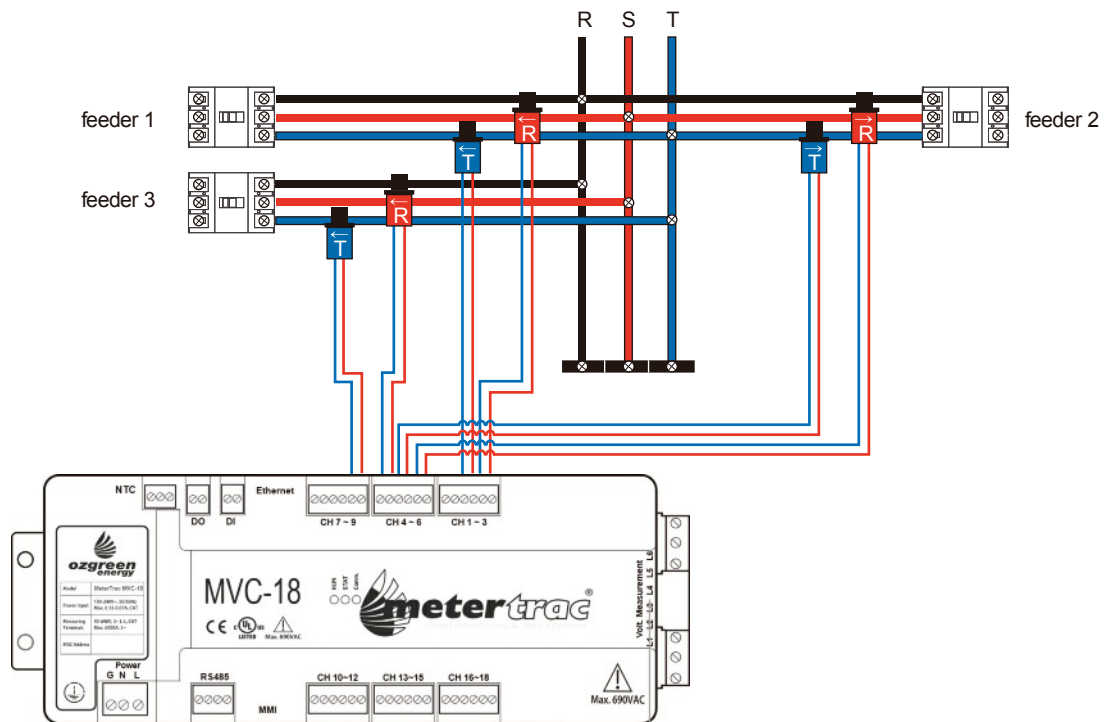
Feeder	Load Type	CT Primary Value	Breaker Match #1	Breaker Match #2	Breaker Match #3	OC Level
Feeder 4	2.1P2wS	50				10.00
Feeder 5	3.1P2wT	50				10.00
Feeder 6	3.1P2wT	50				10.00

feeder 4 setting

feeder 5 setting

feeder 6 setting

9) Example3) - 3P- 3W (2CT's)



■ Setting using the menu [Feeder Setting]

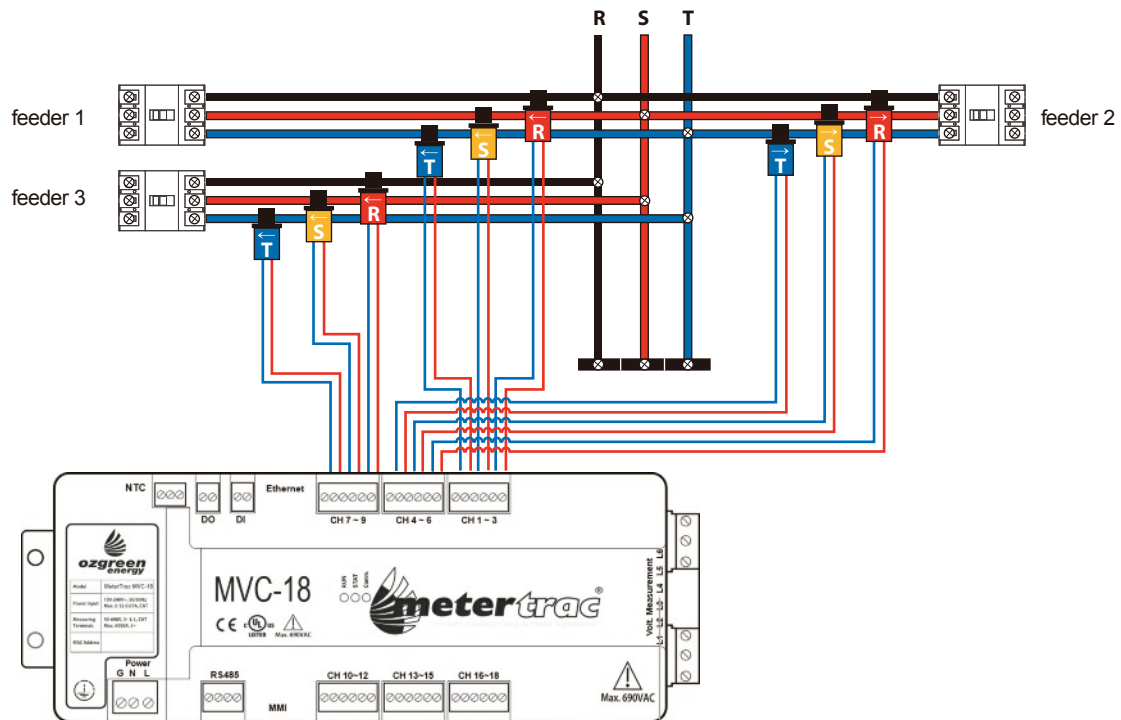
MultIGEM Sim v1.17

File View Setting Help

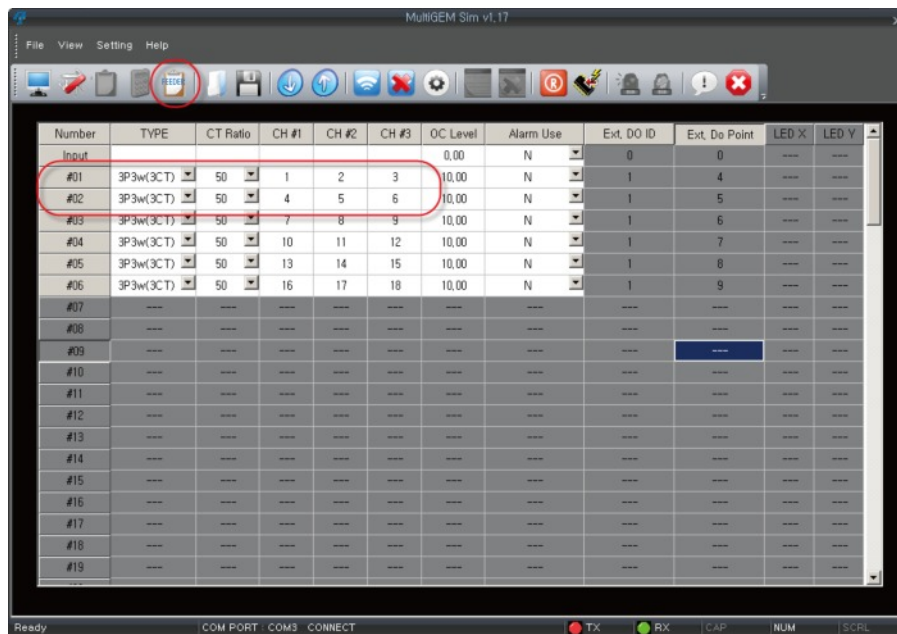
Number	TYPE	CT Ratio	CH #1	CH #2	CH #3	OC Level	Alarm Use	Ext. DO ID	Ext. Do Point	LED X	LED Y
Input						0.00	N	0	0		
#01	3P3w(2CT)	50	1	2	2	10.00	N	1	4		
#02	3P3w(2CT)	50	4	5	5	10.00	N	1	5		
#03	3P3w(2CT)	50	6	8	7	10.00	N	1	6		
#04	3P3w(2CT)	50	8	11	9	10.00	N	1	7		
#05	3P3w(2CT)	50	10	14	11	10.00	N	1	8		
#06	3P3w(2CT)	50	12	17	13	10.00	N	1	9		
#07											
#08											
#09											
#10											
#11											
#12											
#13											
#14											
#15											
#16											
#17											
#18											
#19											

Ready COM PORT COM3 CONNECT TX RX CAP NUM SCPL

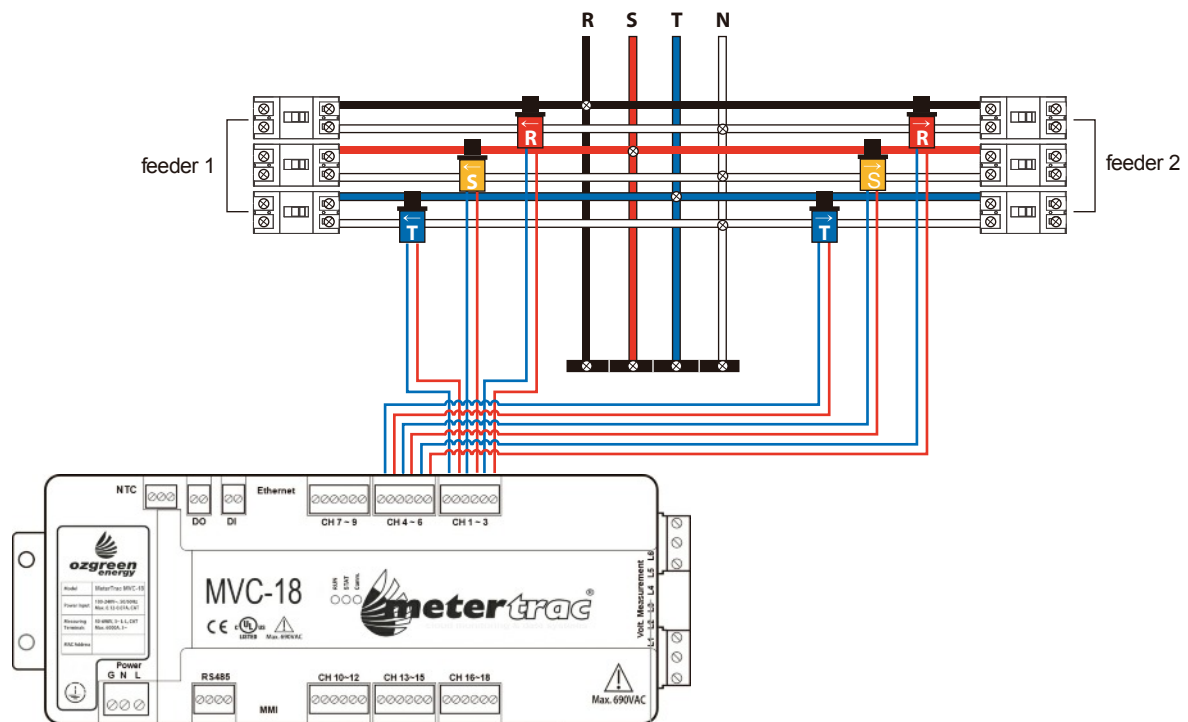
10) Example 4) 3P - 3 W (3CT's)



■ Setting using the menu [Feeder Setting]



11) Example 5) 3P-4W connection



■ Setting using the menu [Feeder Setting]

MultigEM Sim v1.17

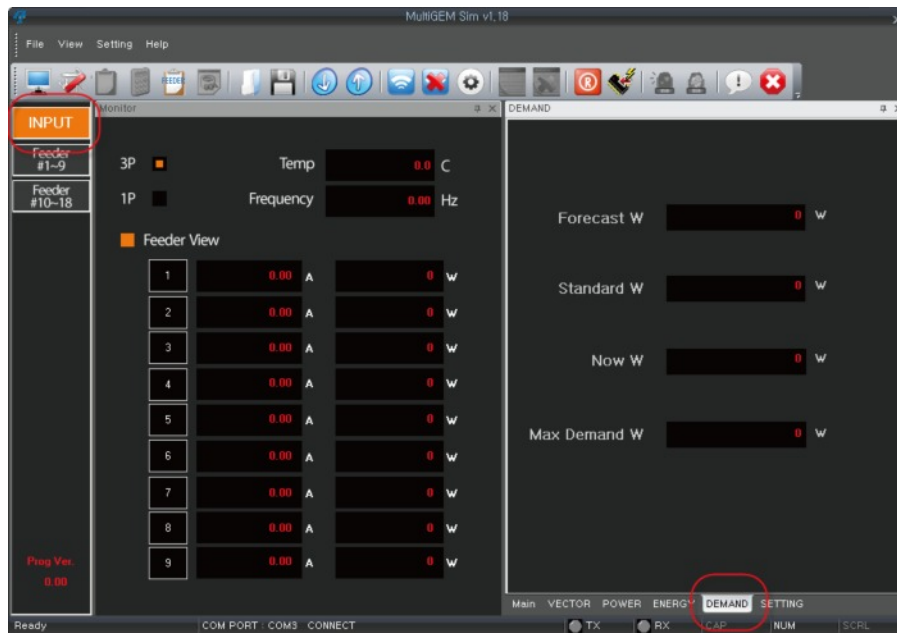
Number	TYPE	CT Ratio	CH #1	CH #2	CH #3	OC Level	Alarm Use	Ext. DO ID	Ext. Do Point	LED X	LED Y
Input						0,00	N	0	0		
#1	3P4w	50	1	2	3	10,00	N	1	4		
#2	3P4w	50	10	11	12	10,00	N	1	5		
#3	3P4w	50	4	5	6	10,00	N	1	6		
#4	3P4w	50	13	14	15	10,00	N	1	7		
#5	3P4w	50	7	8	9	10,00	N	1	8		
#6	3P4w	50	16	17	18	10,00	N	1	9		
#7											
#8											
#9											
#10											
#11											
#12											
#13											
#14											
#15											
#16											
#17											
#18											
#19											

Ready COM PORT COM3 CONNECT TX RX CAP NUM SCRL

4.4 Demand Indicator

The MeterTrac MCV-18 is able to control the external DO module for demand management purposes if the power use exceeds predicted target power.

NOTE: this feature is linked to and managed in the MeterTrac™ cloud based management system.

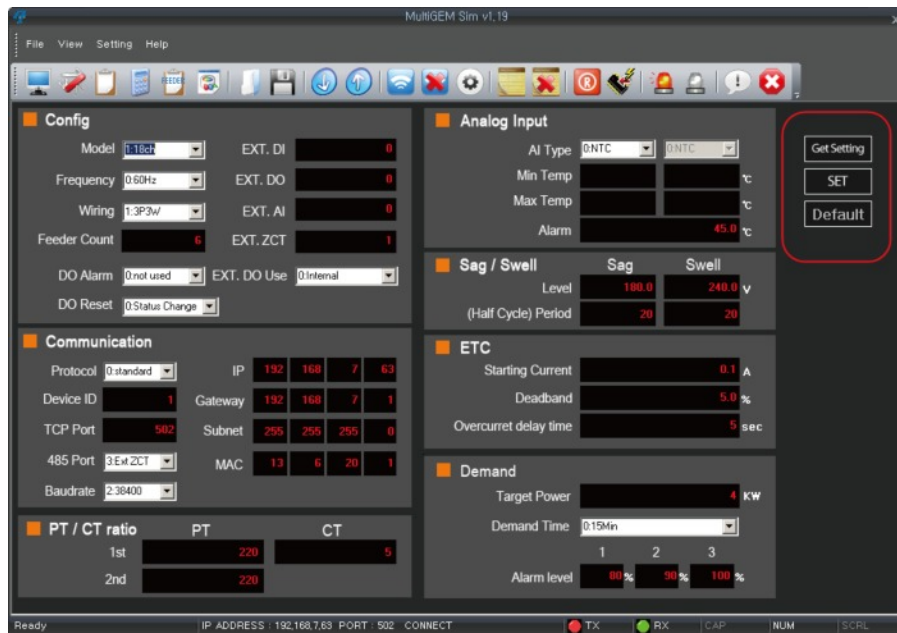


It calculates the data below using the feeder #1 data.

- 1) Forecast power : The forecasted power of the last time period of the demand time window. When the demand window closes the demand time is finished and it resets automatically.
- 2) Criteria-power : The criteria power value to control the present power against the target power set.
- 3) Present power : Used power from the demand window start time to the present time of the demand window time.
- 4) Max demand power : the max demand power in a month.

5. Settings

At the beginning of communication it reads all the setting data of MeterTrac MVC-18.
By using the icon below stored settings of MeterTrac MVC-18 can be read.



Using the icon below, the setting file can be read and stored in the MeterTrac MVC-18.



After changing all the data, Click the  ->  icon so that it can be stored and the meter restarted.

5.1 Config

- 1) Model Select : Select a model of MeterTrac meter - 18CH
(NOTE 36CH and 99CH models are undergoing product development and are not available for sale at this time)
- 2) Frequency : Select system frequency. (60/50Hz)
- 3) Wiring : Select system wiring type. (3P-4W, 3P-3W (2CT))
- 4) Feeder Count : Input the number of feeder circuits to be used.
- 5) DO Type : Set the usage type of the DO (digital output) of MeterTrac MVC-18 meter itself.
 - 1 = not used
 - 2 = Temp Alarm : If the temperature over the setting value for 5 seconds, DO trips.
 - 3 = Event Alarm : When the measured value is over the temperature setting or overcurrent setting etc, the DO trips.
- 6) DO Status : Set the DO reset type.
 - 1 = Status Change : When the temperature or event gets alarm/normal status, DO operates Trip/Reset accordingly.
 - 2 = DI Input : It re-sets DO point when DI point input gets status signal
 - 3=Comm : It resets DO point by communication with a Host.

5.2

Communication

Protocol

0:standard

IP

192

168

7

64

Device ID

1

Gateway

192

168

7

1

TCP Port

502

Subnet

255

255

255

0

485 Port

2:modbus slave

MAC

13

6

20

1

Baudrate

4:115200

- 1) Protocol : It sets the Protocol to be used.
1 = Standard : Standard Modbus Protocol.
2 = Other : Non-standard Modbus Protocol (2 byte count expansion)
- 2) Device ID : Device ID used to communicate by Modbus.
- 3) IP,GW,SM : Settings for IP, Gateway, Subnet mask for Ethernet communication
- 4) Manufacture ID : It displays manufacturing year, month, day and serial no of MeterTrac MCV-18
- 5) TCP Port : It sets device Port number for Modbus communication.
- 6) 485 Port : It sets the usage of RS485 Port:
1 = EXT IO : Modbus communication of an external DI/DO (Option)
2 = Modbus Slave : Operates meter as a Modbus Slave.

5.3 PT/CT

PT / CT ratio	PT	CT
1st	220	5
2nd	220	

This setting is used where it may be required to make a CT connection to an existing CT already fitted on a mains feeder.
NOTE: A special version of MeterTrac MCV-18 is required for this purpose where the Secondary of CT is factory set at 5 Amps..

- 1) 1st: Input the primary voltage/current value of PT/CT.
- 2) 2nd: Input the secondary voltage value of PT.
example 1) primary 220V / secondary 220V
- 1st: 220V, 2nd: 220V
example 2) primary 22,900V / secondary 380V
- 1st: 22900V, 2nd: 380V
example 3) In case of 400/5 CT of the main feeder

5.4 Analog

Analog Input	
AI Type	0:NTC
Min Temp	°C
Max Temp	°C
Alarm	45.0 °C

Min/Max Temp is activated when the 4~20mA mode is selected.

- 1) AI Type : It selects the temperature sensor type either NTC or 4~20mA
- 2) Min Temp : The temp value at 4mA of AI.
- 3) Max Temp : The temp value at 20mA of AI.
- 4) Alarm Threshold : It sets a temp, alarm level. When the temp alarm level is maintained for 5 seconds, it gives an alarm signal.

5.5 Sag/Swell

In case of Sag/Swell, It measures CH #1~#3 matching voltage.

If CH #1~#3 are all connected to R phase then the meter will measures only R voltage for the Sag/Swell events.

Therefore it is advised to use the feeder connections with CH1 : R, CH2 : S, CH3 : T

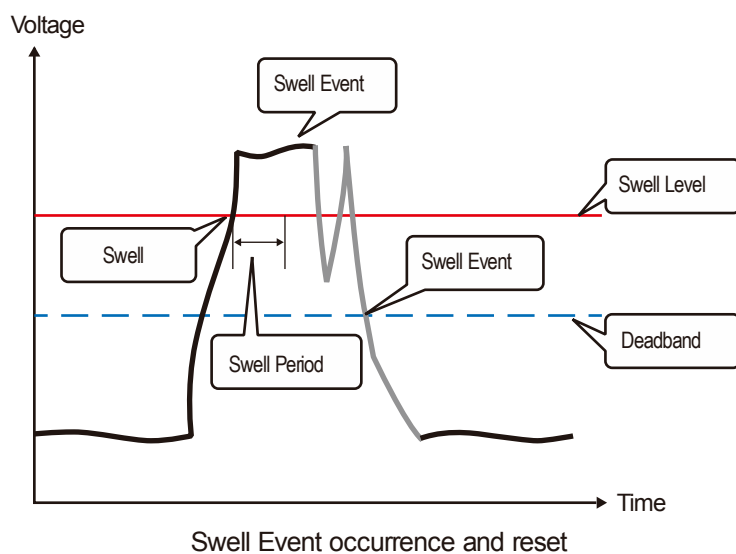
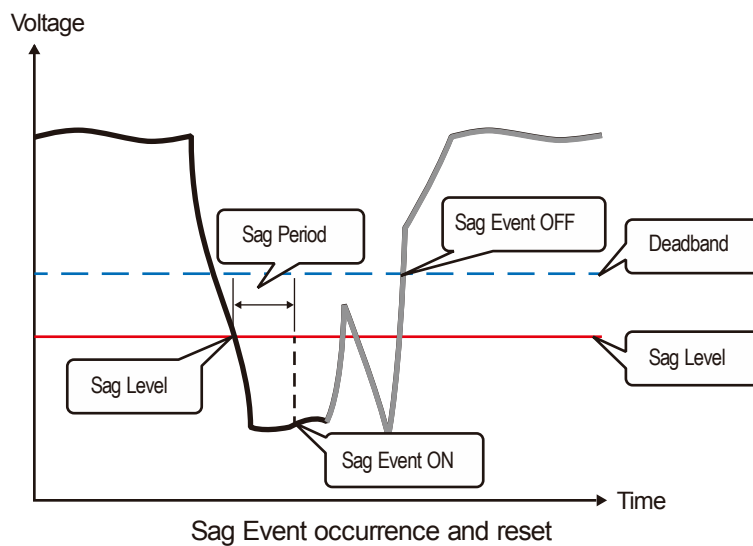
Sag / Swell		
	Sag	Swell
Level	200.0	240.0 V
(half cycle) Period	20	20

1) Sag/Swell Level : Input of Sag/Swell Trigger Level.

2) Sag Period : The period set of Sag

3) Swell Period : The period set of Swell

The period unit is a Half cycle.



5.6 ETC

ETC

Starting Current	0.1 A
Deadband	5.0 %
Overcurrent delay time	5 sec

- 1) Current Threshold : It sets a minimum start current.
- 2) Deadband : It sets Deadband for a Current Threshold.
example 1) Current Threshold : 1A, Deadband : 10%
 - When the current is over 1A, it displays current, when the current is lower than 0.9A, it doesn't display the current because the Deadband is 10%.Example 2) Sag level 180V, Deadband : 10%
 - Alarm event : lower than 180V
 - Alarm reset : higher than 198V ($180V + 180V \times 0.1$)
- 3) Overcurrent Delay time : It sets a delay time of overcurrent for feeders. When the over current is measured during a time set, it considers it as an alarm event.

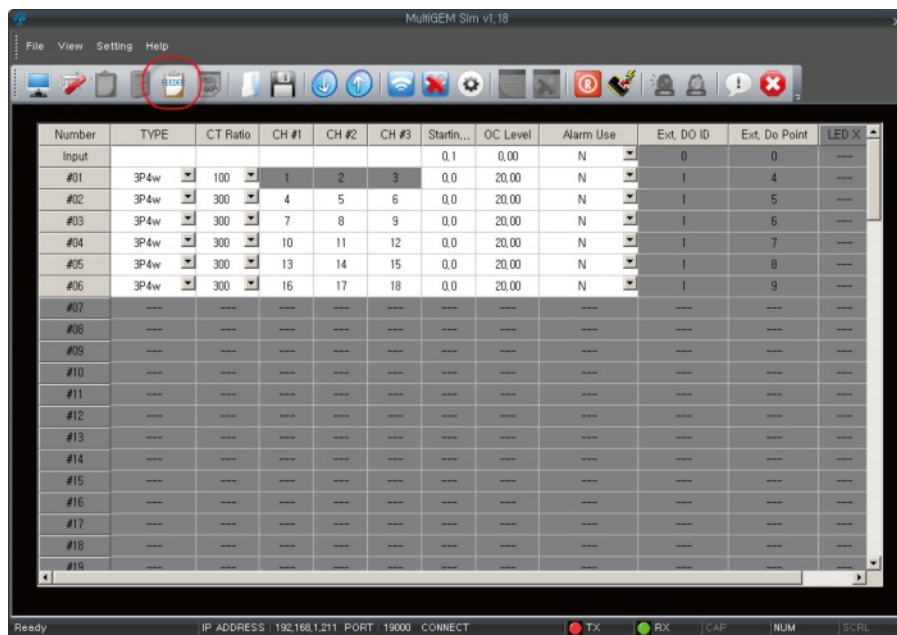
5.7 Demand

Demand

Target Power	10 KW
Demand Time	0:15Min
Alarm level	1 2 3 80 % 90 % 100 %

- 1) Target Power : Set the Target power
- 2) Demand Time : Set the demand time (15/30/60 min)
- 3) Alarm Level : It is used for alarm signal output above forecast power demand.

6. Feeder Circuit Setting



It sets the type, CT ratio of each ratio.

It is deactivated except for the number of the Feeders in the count setting.

1. Existing file use.

Feeder Set Icon Click -> DB File Open Click -> existing stored file click -> After modification of settings, Click the DB Send icon -> Rom save -> Restart the device by reset button.

2. Stored DB file use in MeterTrac MCV-18

Feeder Set Icon Click->DB Receive icon Click -> After modification of settings, Click the DB Send icon -> Rom save -> Restart the device by reset button.

6.1 Type

It sets the system wire type of feeders.

- 1) 1P (R Phase CT) : 1P - 2W_R
- 2) 1P (S Phase CT) : 1P - 2W_S
- 3) 1P (T Phase CT) : 1P - 2W_T
- 4) 3P - 3W (2CT) : 3P3W (L2 phase current is displayed by calculation)
- 5) 3P - 4W : 3P4W
- 6) 3P - 3W (3CT) : 3P3W

6.2 CT Ratio

Input the primary value of CT connected to the CH terminal. (secondary value is 100mA fixed)

6.3 CH #1,2,3

Input the terminal numbers to be connected to feeders.

6.4 Starting Current

Sets the starting current of each feeder. It displays the current a 0A if the current is lower than the setting value.

6.5 OC Level

It sets a Overcurrent Alarm trigger Level of feeders.

This setting is linked and operated with the ETC/Overcurrent delay time in the Setting window.

6.6 Alarm Use

It determines whether the alarm of Overcurrent will be used or not for the overcurrent and time setting of each feeder. If used an external DO module is operated.

6.7 Ext. DO ID/Point

If the Alarm Use is set by activation, it sets the ID and the Point number of an external module to be controlled.

6.8 LED X/Y (Special-build MeterTRac MVC-18 units only)

It is activated when the Config/Model is set with the model number of the special build unit in the Setting window.

It sets the X/Y coordinates of LED when the feeder current flows over the threshold level.



After changing the Feeder setting, it is necessary to click the   icons and store DB and restart the MeterTracMVC- 18 to apply it.

7. ROM Save



When the Feeder setting is changed click the Rom Save icon to save it in the DB.

8. Reset



If the DB setting is changed click the Reset icon button to apply the changed DB.

■ APPENDIX

1. Register Map

1.1 Common Address

Address	Description	FC	size	type	scale	Remark
0	Heart Beat	4	2	UINT16	1	Increase every 10ms
1	year	4,16	2	UINT16	1	2013
2	Month	4,16	2	UINT16	1	1~12
3	Day	4,16	2	UINT16	1	1~31
4	Day of week	4,16	2	UINT16	1	0 : sun, 1 : mon
5	hour	4,16	2	UINT16	1	0~23
6	Minute	4,16	2	UINT16	1	0~59
7	Second	4,16	2	UINT16	1	0~59
8	Temperature 1	4	2	INT16	10	
9	Temperature 2	4	2	INT16	10	
10	Frequency	4	2	UINT16	100	
11	Program version	4	2	UINT16	1	V1.01 => 0x0101
12	This month CO2 use	4	2	UINT16	10	
13	reserved	4	2	UINT16		
14	reserved	4	2	UINT16		
15	reserved	4	2	UINT16		
16	internal status	4	2	UINT16		Refer to Table 1
17	Input status	4	2	UINT16		Refer to Table 2
18	feeder #1 status	4	2	UINT16		Refer to Table 3
19	feeder #2 status	4	2	UINT16		
20	feeder #3 status	4	2	UINT16		
21	feeder #4 status	4	2	UINT16		
22	feeder #5 status	4	2	UINT16		
23	feeder #6 status	4	2	UINT16		
24	feeder #7 status	4	2	UINT16		
25	feeder #8 status	4	2	UINT16		
26	feeder #9 status	4	2	UINT16		
27	feeder #10 status	4	2	UINT16		
28	feeder #11 status	4	2	UINT16		
29	feeder #12 status	4	2	UINT16		
30	feeder #13 status	4	2	UINT16		
31	feeder #14 status	4	2	UINT16		
32	feeder #15 status	4	2	UINT16		
33	feeder #16 status	4	2	UINT16		
34	feeder #17 status	4	2	UINT16		
35	feeder #18 status	4	2	UINT16		

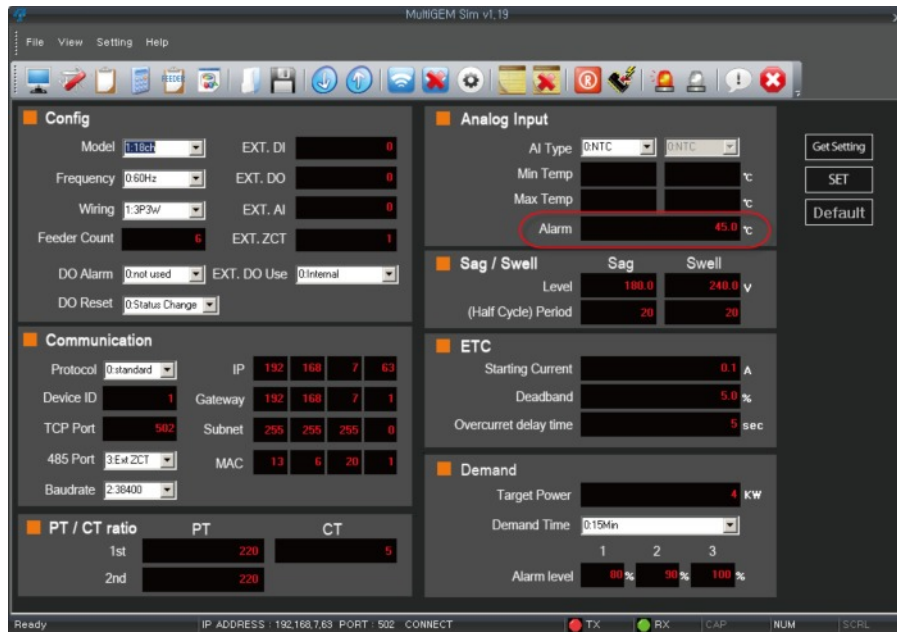
...	reserved					
120	Sag Year	4	2	UINT16		The latest Sag time
121	Sag Month	4	2	UINT16		
122	Sag Day	4	2	UINT16		
123	Sag Hour	4	2	UINT16		
124	Sag Minute	4	2	UINT16		
125	Sag second	4	2	UINT16		
126	Swell Year	4	2	UINT16		The latest Swell time
127	Swell Month	4	2	UINT16		
128	Swell Day	4	2	UINT16		
129	Swell Hour	4	2	UINT16		
130	Swell Minute	4	2	UINT16		
131	Swell second	4	2	UINT16		
...	reserved					

Table 1. Internal Status

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
—	—	—	—	—	—	—	—	—	—	—	Temp	—	—	—	DI

- bit 4 : Temperature Alarm (0 - normal, 1- abnormal)

In the event that the measured temperature is higher than the alarm setting level during 5 sec, Alarm bit 4 is triggered.



- bit 0 : DI (0 – open, 1-close)

MeterTracMVC-18 shows the DI status at the bit 0.

Table 2. Sag/Swell Status

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
—	—	—	Sag T	Sag S	Sag R	Swell T	Swell S	Swell R	—	—	—	—	—	—	—

- bit 12~10 : Sag Alarm (0 - return to normal, 1- occurred)

The measured voltage is lower than the setting level and maintained over the duration of 10 cycles (basic unit is Half Cycle).

- bit 9~7 : Swell Alarm (0 – return to normal, 1- occurred)

The measured voltage is higher than the setting level and was maintained over the duration of 10 cycles (basic unit is Half Cycle).

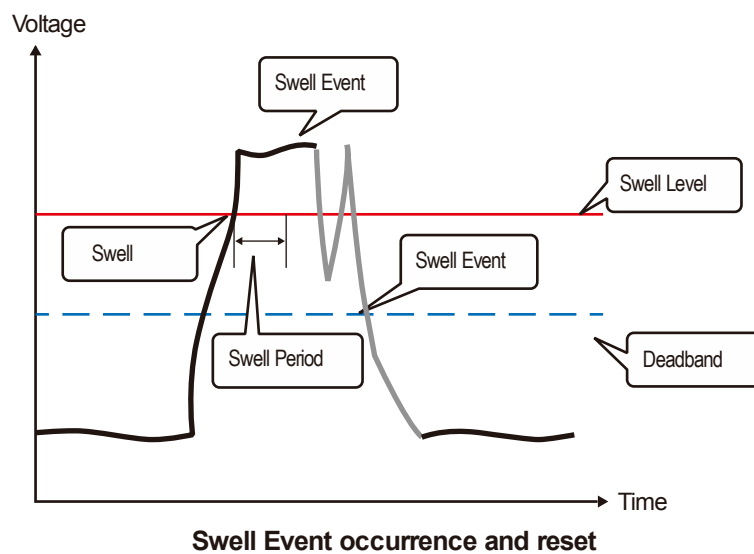
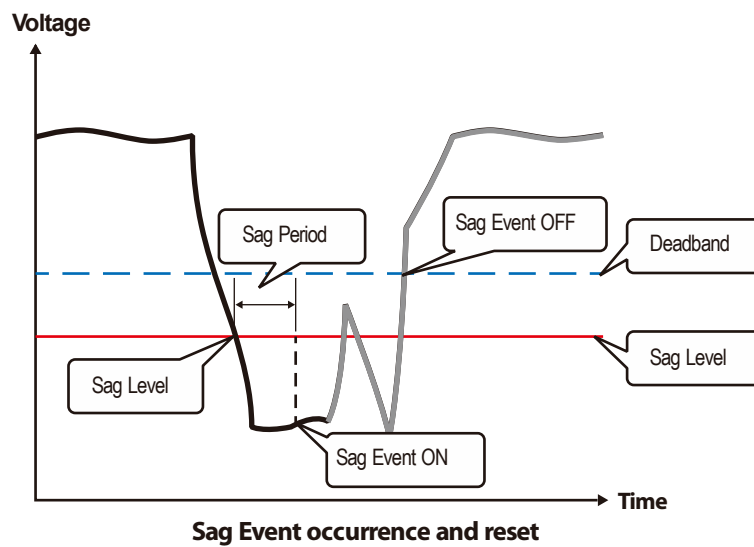
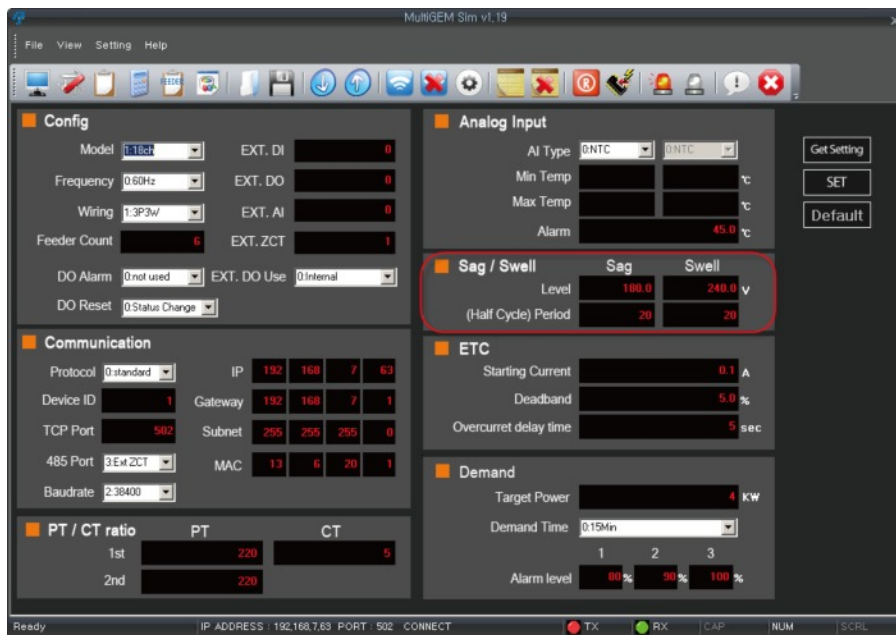
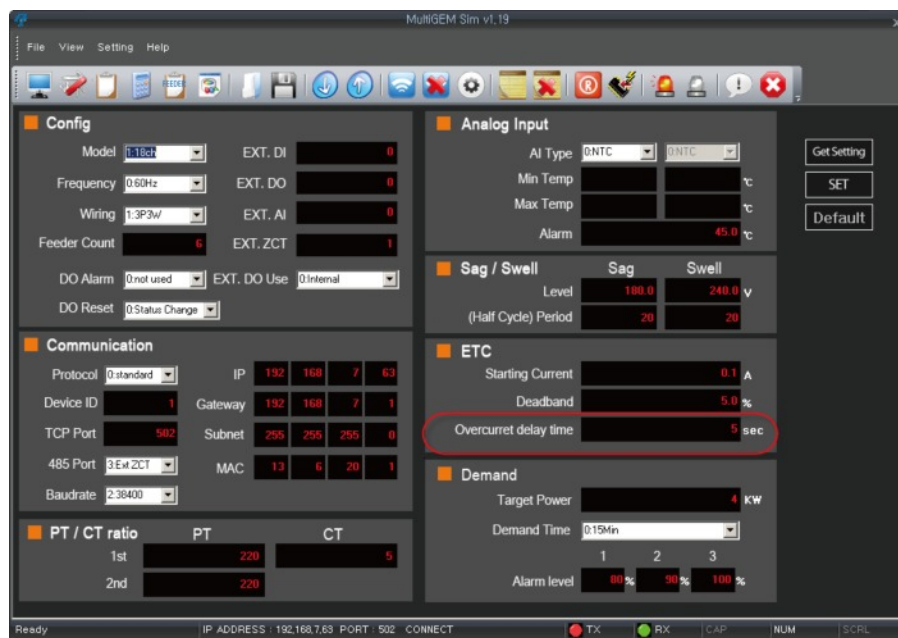


Table 3. Feeder

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
—	—	—	—	—	—	—	—		—	—	—	OC T	OC S	OC R	Current flowing

- **bit 3~1 : Overcurrent Alarm (0 – return to normal (reset) , 1- occurred)**

Number	TYPE	CT Ratio	CH #1	CH #2	CH #3	Starting Current	OC Level	Alarm Use
Input						0,1	0,00	N
#01	3P4w	50	1	2	3	0,1	80,00	N
#02	3P4w	50	4	5	6	0,1	80,00	N
#03	3P4w	50	7	8	9	0,1	80,00	N
#04	3P4w	50	10	11	12	0,1	80,00	N
#05	3P4w	50	13	14	15	0,1	80,00	N
#06	3P4w	50	16	17	18	0,1	80,00	N



- When the current level is below the setting during a delay time setting, It triggers the bit. (time unit is 1 sec) bit 0 : Feeder current status (0 – no flow, 1 – flow)

Number	TYPE	CT Ratio	CH #1	CH #2	CH #3	Starting Current	OC Level	Alarm Use
Input						0,1	0,00	N
#01	3P4w	50	1	2	3	0,1	80,00	N
#02	3P4w	50	4	5	6	0,1	80,00	N
#03	3P4w	50	7	8	9	0,1	80,00	N
#04	3P4w	50	10	11	12	0,1	80,00	N
#05	3P4w	50	13	14	15	0,1	80,00	N
#06	3P4w	50	16	17	18	0,1	80,00	N

- When the current above the Starting Current setting occurs it is above the minimum current detection level. The current higher than the level set is sensed as the load is operated.

1.2 Voltage input

Address	Item	Phase	Description	FC	Size	Type	Scale	Remark
150	Main input voltage	R	Phase -Neutral	4	4	UINT32	100	
152			Line to Line	4	4	UINT32	100	
...			reserved					
162			Volt. Unbalance	4	2	UINT16	100	
168		S (L2)	Phase -Neutral	4	4	UINT32	100	
170			Line to Line	4	4	UINT32	100	
...			reserved					
180			Volt. Unbalance	4	2	UINT16	100	
186		T (L3)	Phase -Neutral	4	4	UINT32	100	
188			Line to Line	4	4	UINT32	100	
...			reserved					
198			Volt Unbalance	4	2	UINT16	100	
...		Common	reserved					
213			Total volt. Unbalance	4	2	UINT16	100	
...			reserved					
218		Demand	Forecast Energy	4	4	UINT32	1	
220			Criterion Energy	4	4	UINT32	1	
222			Present Energy	4	4	UINT32	1	
224			Max Demand Energy	4	4	UINT32	1	Max in month

$$\text{Voltage Unbalance} = \frac{|V_{\text{phase}} - V_{\text{average}}|}{V_{\text{average}}} \times 100\%$$

1.3 Feeder

	Feeder	R	Phase voltage	4	4	UINT32	100	
232			Phase current	4	4	UINT32	100	
234			Active power	4	4	INT32	1	
236			Reactive power	4	4	INT32	1	
238			Apparent power	4	4	UINT32	1	
240			Voltage unbalance	4	2	UINT16	100	
241			Phase angle	4	2	UINT16	100	
242			Power factor	4	2	INT16	100	
243			power THD	4	2	UINT16	100	
244		S	Phase voltage	4	4	UINT32	100	
246			Phase current	4	4	UINT32	100	
248			Active power	4	4	INT32	1	
250			Reactive power	4	4	INT32	1	
252			Apparent power	4	4	UINT32	1	
254			Voltage unbalance	4	2	UINT16	100	
255			Phase angle	4	2	UINT16	100	
256			Power factor	4	2	INT16	100	
257			power THD	4	2	UINT16	100	
258		T	Phase voltage	4	4	UINT32	100	
260			Phase current	4	4	UINT32	100	
262			Active power	4	4	INT32	1	
264			Reactive power	4	4	INT32	1	
266			Apparent power	4	4	UINT32	1	
268			Voltage unbalance	4	2	UINT16	100	
269			Phase angle	4	2	UINT16	100	
270			Power factor	4	2	INT16	100	
271			power THD	4	2	UINT16	100	
272		Common	Total current	4	4	UINT32	100	
274			Total active power	4	4	INT32	1	
276			Total reactive power	4	4	INT32	1	
278			Total apparent power	4	4	UINT32	1	
280			Average volt unbalance	4	2	UINT16	100	
281			Average power factor	4	2	INT16	100	
282			Average power THD	4	2	UINT16	100	
283			-	4	2	UINT16	100	
284			reserved	4	4			
286			reserved	4	4			
288			reserved	4	4			

$$\text{Current Unbalance} = \frac{|I_{\text{phase}} - I_{\text{average}}|}{I_{\text{average}}} \times 100\%$$

1.4 Energy

Address	Item	Description	FC	Size	Type	Scale	Remark
8022	Feeder	Active Energy	4	4	UINT32	10	kWH, Ex)101 - > 10.1kWH
8024		This month Active Energy	4	4	UINT32	10	
8026		Last month Active Energy	4	4	UINT32	10	
8028		Reactive Energy	4	4	UINT32	10	
8030		This month Reactive Energy	4	4	UINT32	10	
8032		Last month Reactive Energy	4	4	UINT32	10	
8034		Apparent Energy	4	4	UINT32	10	
8036		This month Apparent Energy	4	4	UINT32	10	
8038		Last month Apparent Energy	4	4	UINT32	10	
8040	Feeder	Active Energy	4	4	UINT32	10	
8042		This month Active Energy	4	4	UINT32	10	
8044		Last month Active Energy	4	4	UINT32	10	
8046		Reactive Energy	4	4	UINT32	10	
8048		This month Reactive Energy	4	4	UINT32	10	
8050		Last month Reactive Energy	4	4	UINT32	10	
8052		Apparent Energy	4	4	UINT32	10	
8054		This month Apparent Energy	4	4	UINT32	10	
8056		Last month Apparent Energy	4	4	UINT32	10	
:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:
8328	Feeder #18	Active Energy	4	4	UINT32	10	
8330		This month Active Energy	4	4	UINT32	10	
8332		Last month Active Energy	4	4	UINT32	10	
8334		Reactive Energy	4	4	UINT32	10	
8336		This month Reactive Energy	4	4	UINT32	10	
8338		Last month Reactive Energy	4	4	UINT32	10	
8340		Apparent Energy	4	4	UINT32	10	
8342		This month Apparent Energy	4	4	UINT32	10	
8344		Last month Apparent Energy	4	4	UINT32	10	

- Cumulative Energy : The energy cumulated from the initial installation.
- This month Energy : The energy cumulated from the first day of this month.
- Last month Energy : The energy cumulated from the first day to the last day 31st (30th) of the last month

2. Accessory

1. You must use only authorised CTs that are made for use with MeterTrac MCV-18.
2. You must use only CTs certified by IEC/UL standards.

3. Meter Calibration

Calibration of MeterTrac MVC-18

A significant drift in calibration is highly unlikely. Therefore, a yearly re-calibration of meter is not required.

If ever required current channel and volt channel can be calibrated by qualified site technicians, if a stable calibration source can be applied.

Calibration on MeterTRac MCV-18 requires a precise input of 220 Volts, 5 Amps or 20 Amps.

If this equipment is unavailable, contact OzGreen Energy Pty Ltd for assistance.

4. Safety



DANGER

This symbol alerts that ignoring an instruction or incorrect action may cause a death or serious injury.



WARNING

This symbol alerts that ignoring an instruction or incorrect action may cause minor injury or damage to the product.



CAUTION

This symbol alerts that ignoring an instruction or incorrect action may cause a product malfunction or data or property loss.



GUIDE

This manual is a guide for product installation, operation and maintenance

[Installation]

Installation and maintenance should be performed only by qualified personnel.



DANGER

Improper handling and use of this product can cause serious injury or death to persons if careless handling of low and high voltage electricity occurs during installation and operation of the product.

- Hazardous voltage always exists on the connecting terminal of PT/CT, Digital Input/Output, Control power when the meter is connected to a power circuit
- Be sure to follow the safety instruction in this manual during installation and maintenance of the product. Carefully observe all safety precautions required by law, the specified specifications and electric regulations and laws in force at the place of installation.
- Take care that personnel are not able to touch the terminals of the meter and any electrical wire sheathing after the meter installation and all wiring is finished



CAUTION

For protection against electrical shock, all accessories, such as Personal computer and computer connection devices must be certified by IEC/UL.



Definition of measurement

- 1) Measurement category IV is for measurements performed at the source of the low-voltage installation.
- 2) Measurement category III is for measurements performed in a building or factory installation.
- 3) Measurement category II is for measurements performed on circuits directly connected to the low voltage installation.
- 4) Measurement category I is for measurements performed on circuits not directly connected to MAINS.



CAUTION

A fused branch circuit protection, rated at 250V/20A maximum, with isolator must be installed on the main incoming power supply, external to the unit.

The branch circuit fused isolator must be fitted with two UL listed 250Vac/2.0A rated fuses, one on the live and one on the neutral supply circuits. The fuses must comply with UL 248-4, Class CC, Guide JDDZ and be contained by Class CC fuse holders.

A suitable switch or circuit-breaker, meeting IEC60947-1 and IEC 60947-3, shall be used as a means of disconnection.

Use at least AWG 18(maximum AWG 14) wires for the incoming supply. For field wiring terminals use copper conductors rated 75 °C only, Field wiring tightening torque 1.2Nm



CAUTION

The following part is considered as the equipment disconnection device.

A switch or circuit-breaker shall be included in the meter installation. The switch shall be in close proximity to the equipment and within easy reach of the operator. The switch shall be marked as the disconnecting device for the equipment



CAUTION

To clean the meter, wipe it with a clean, dry cloth.



CAUTION

Installation of the meter must be performed only by qualified personnel who follow standard safety precautions during all procedures. Those personnel should have appropriate training and experience with high voltage devices.

Appropriate safety gloves, safety glasses and protective clothing are recommended and should be used.

- If THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.
- THERE IS NO REQUIRED PREVENTATIVE MAINTENANCE OR INSPECTION NECESSARY FOR SAFETY. ANY REPAIR OR MAINTENANCE SHOULD BE PERFORMED BY THE FACTORY.
- First of all, be sure to read this manual for correct use of the product.
- If you find any missing contents or error, please inform us.
- OzGreen Energy Pty Ltd and its OEM manufacturer assume no responsibility for any direct or indirect loss or damage which may occur through use of this product, regardless of any failure to perform on the part of this product.

Standard



■ Manufacturer Information

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